LIBRARY
RECEIVED
NOV 25 1927
U. S. Department of Agriculture

# Food Manufacture

THE JOURNAL OF THE FOOD INDUSTRY

*A Journal devoted to the production and manufacture of:*

**Chocolate, Confectionery, Biscuits, Bread, Cake, Beers, Cordials, Milk, and Invalid Foods, Tonic and Alcoholic Wines, Ice Cream, Patent Flours, Sugar, Preserved Fruits and Meats and Fish, Pastes and Extracts; Essences, Flavourings, Sauces and all edible commodities involving a process of manufacture.**

**Annual Subscription, 10/- (including postage). Single copies, 1/-**

**NOVEMBER, 1927 Vol. II., No. 1**

*Publishing, Editorial and Advertisement Offices:*
**173-5 FLEET STREET, LONDON, E.C. 4**
*Proprietors and Publishers:* **LEONARD HILL, LTD.**

## "Broadbent" LABORATORY CENTRIFUGALS

A 9-in. *Electrically-driven Laboratory Centrifugal.* 2,400 *Revs. per Minute.*

Write for Catalogue of Laboratory Centrifugals or for Commercial Size Machines.

CENTRIFUGAL MACHINES will DRY, SEPARATE, or FILTER many kinds of Materials, Substances and Emulsions, and are now being used for extracting Fruit Juices from Pulp, Infants' and Invalids' Foods, Egg Powders and Dried Eggs, Milk Sugar from Whey, Health Salts and Beverages, etc., etc.

Why not instal a small Laboratory Centrifugal and experiment with your products.

Where use can be made of a Commercial Size Centrifugal it may save Hundreds of Pounds a year.

## THOMAS BROADBENT & SONS, Ltd.

*Telegrams:* "BROADBENT, HUDDERSFIELD"
*Telephones:* 1581 (4 lines)

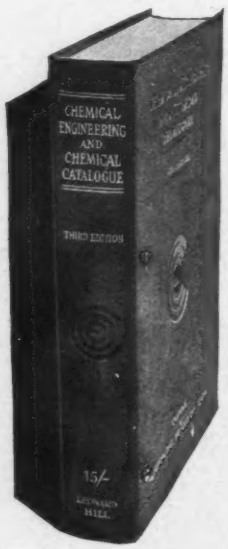
CENTRIFUGAL MACHINERY ENGINEERS
HUDDERSFIELD
*ESTABLISHED 1864*

*LONDON OFFICE:* Suffolk House, Laurence Pountney Hill, E.C.
*Telephone:* 1163 Royal.

# You never know what you want till you want it !

YOU never appreciate the value of your insurance until the accident happens. Catastrophies are not always physical.

An executive badly or ill-informed may face serious catastrophies at any time. Get your chemical practice right. Have the Catalogue always at your elbow, it will carry you quickly through many difficulties.




SEND FOR THIS VALUABLE
400-PAGE BOOK TO-DAY

CENTRAL RESEARCH LABORATORIES
SUSSEX LANE
SYDNEY

14th.July 1926.

Mr. W. Leonard Hill
Publisher Chemical Engineering & Chemical Catalogue;
173, Fleet Street,
LONDON E.C.4.

Dear Sir,

We are in receipt of your 1926 edition of the Chemical Engineering and Chemical Catalogue, and note considerable increase in the subjects over your last years publication. We consider that the information that this volume contains is of the greatest value to overseas manufacturers, and fills a long felt want by enabling us to get in touch with British Products, whereas hitherto American Porducts, which were widely advertised by similar means were often purchased. We would suggest that this Catalogue should be made better known in this Country by circularising manufacturers, a full list of whom can be obtained by reference to the various directories at Australia House, London.

Yours faithfully,
CENTRAL RESEARCH LABORATORIES LTD
J.H. Watts Manager.

**What it is—**

A Catalogue of Chemical Plant
A Description of Chemical Products
A Directory of the Chemical Industry
A Handbook of Tables and Data
A Bibliography of Scientific and Technical Books
A Manual on the application of Chemistry in Industry
A Buyer's Guide
A Trade Names Index

**Reduced Price**

*In past years the Catalogue has been sold at £1 1s. net. It has now been found possible to offer a much larger and more valuable book at 15/-, and to introduce an annual subscription rate of* **10/6**

## Chemical Engineering and Chemical Catalogue

LEONARD HILL, LTD., 175 FLEET STREET, LONDON, E.C. 4

# Food Manufacture

THE JOURNAL OF THE FOOD INDUSTRY

Published every month at
173/5 FLEET ST., LONDON, E.C.4

*Annual Prepaid Subscription, 10s. post free*

*Telephone: Central 8217.* *Proprietors: Leonard Hill, Ltd.*

Vol. II., No. 1

**The editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings whenever possible.**

November, 1927


## CONTENTS


| | PAGE |
|---|---|
| EDITORIAL COMMENTS | 167–170 |
| FORTHCOMING ARTICLES | 170 |
| BY-PRODUCTS UTILISATION BY PIGS | 171 |
| FOOD IMPURITIES | 173 |
| THE NEW CHEWING-GUM FACTORY | 176 |
| WHEAT AND BREAD PRICES | 178 |
| BACTERIA AND THE CANNING INDUSTRY | 179 |
| THE HERRING INDUSTRY | 181 |
| THE PREPARATION AND MARKETING OF FISH | 182 |
| FOOD FACTORY COSTING | 185 |
| REPORT OF THE GOVERNMENT CHEMIST | 187 |
| METHODS FOR IMPROVING BAKERY PRACTICE | 188 |
| CANNED GOODS IN CHINA | 189 |
| PERUVIAN IMPORTS | 189 |
| THE DAIRY SHOW | 190 |
| U.K. DRIED MILK REGULATIONS | 190 |
| MOISTURE IN BREAD | 191 |
| BABY FOODS | 191 |
| COMMERCIAL AND LEGAL NEWS | 192 |
| CURRENT LITERATURE | 195 |
| RECENT PATENTS | 196 |


### Industrial Enterprise.

THE TECHNICAL Director, Mr. C. Cronshaw, of the British Dyestuffs Corporation, in his capacity as Chairman to the Manchester Section of the Society of Chemical Industry, gave, on October 7, an address entitled "The Seven Lamps of Chemical Enterprise."

We would strongly advise everyone connected with the food industry to read with care and thought the published account of this address. We do not remember having come across a more masterly treatment of the factors which will determine, and which are indeed to-day determining, the evolution of the various branches of the great chemical industry. It is an inspiring address, and one which is capable of elaboration and extension to such cognate industries as the one in which we are particularly interested. Besides, there is a link, in that the British Dyestuffs Corporation includes, amongst its somewhat bewildering array of products, the full range of colouring materials for foodstuffs.

### Foodstuff Colours.

In this connection it is not out of place to announce at this point a series of articles dealing with various highly important questions involved in the properties and applications of colours for foodstuffs, which will shortly appear in FOOD MANUFACTURE. These articles, we are happy in stating, are being prepared by the well-known authority, Mr. F. W. Andrews, of the British Dyestuffs Corporation. The first two articles of the series will constitute a review of the foodstuff colours available, the products for which they can and cannot be used, and the troubles which commonly arise in connection with their use. The third article will emphasise the necessity for purity in colouring matters for food; an intimation to the consumer of the guarantee which he should obtain with his colours, and a warning against the indiscriminate manner in which guarantees are being given with colours unsuitable for foodstuffs. We might mention that these articles will constitute an impartial discussion of the subject.

We count ourselves very fortunate in having persuaded Mr. Andrews to place before our readers the results of his wide experience in the application of foodstuff colours. Indeed, this experience is particularly valuable in that it has been gained by long contact with every branch of food industry that has occasion to use colouring matters.

### Research and Economics.

To return to the address delivered at Manchester by Mr. Cronshaw. Usually, diagnosis of the chemical industry of this country has been confined to the single theme of the importance of research. But successful chemical enterprise is a much complicated matter. There are many principles involved of varying importance, and the neglect of any of these may easily disturb and wreck the whole structure. In few

realms of commercial endeavour is the liability to economic changes of such vital importance.

The possible routes to chemical substances are usually both numerous and varied, and the ultimate choice is made, perforce, on general economic grounds, and consequently slight changes in price of a few products are sufficient to upset almost a section of chemical industry; and this same economic trend may often, further to complicate the position, bring new products into extended use. Moreover, economic factors often play strange tricks, converting useless by-products into the salvation of a moribund industry, and relegating hitherto profitable materials to the background. As the science of chemistry grows and expands, it robs, and even as it robs it bestows.

**Target Shooting.**

Research has at various times been divided into all sorts of categories. People have spoken of pure research, applied research, and technical research. No reasonable person who derives his income mainly from the practical application of science, or who has received a scientific training will for one moment deny the value of or the need for pure research, but it is no part of the duty of chemical enterprise to do other than extend a financial helping-hand to such research. Further, there can be no question at all that the soil and atmosphere best suited to pure research are, and always will be, the universities.

With technical or applied research, chemical enterprise is, of course, mainly concerned. Both the value and danger of the former arise because it is concerned with the future, and the shortsighted have sometimes yielded to the apparent necessity of the present. The supreme difficulty in technical research is that of its wise direction. Sir Ernest Rutherford at the British Association, in Liverpool, speaking of this same difficulty of direction, remarked that "it is fatally easy to spend much money in a direct frontal attack on some technical problem of importance when the solution may depend on some addition to knowledge in some other field of scientific inquiry, possibly at a trifling cost." Stripped of its technical obstacles, applied research is therefore a problem of marksmanship. Just as the fighting efficiency of a battleship depends firstly upon good guns, the right ammunition, and efficient shooting, but fundamentally on target control, so good research is target shooting; in other words, accurate direction towards a valuable objective.

**Selling Effects.**

Chemical products are tending more and more to be sold, not for what they are, but for what they will do, and this naturally entails a uniform standard of performance. The analyst, if he is to help chemical enterprise on its future path, must give even finer methods of precision, and of enlarged scope and technique. He must give us precise methods for evaluating effects rather than methods for determining composition.

Chemical enterprise, particularly the organic chemical enterprise, is more and more selling an effect rather than a substance, and as a natural consequence of this, the problems of the general customer are becoming those of the chemical industry itself. And it may be possible that this question of application of chemical products is a fundamental principle of all chemical enterprise. It may be perhaps that synthetic petrol will not only abundantly assist natural supplies, but ultimately revolutionise the petrol engine by reason of some new and unknown property, which initially is merely a problem to be solved before successful use is assured. Some of the greatest drawbacks to the use of chemical products have turned subsequently to be amongst their greatest virtues. It is easier to discover a new product for a specific use than to invent a use for a new product.

**Unity.**

Chemical enterprise cannot be good in parts, it survives only by reason of the strength and well being of the whole; and this can only be measured in terms of the financial and commercial health of its manufacturing ability. The heart and kernel of successful chemical enterprise is efficient manufacturing operation, and this is only possible with unity. Precision, organisation, chemistry, engineering, physics, all are necessary, but it is only the blend and unity of these in equivalent excellence that can ensure successful manufacturing operations.

Organic chemical manufacture is to-day intrinsically more difficult than ever; great complication exists, and greater degrees of precision and purity, more sensitive control, are required than ever before. The days when a new product could be sold at a price which would both allow a rich reward for the inventor, and a high cost of manufacture, have departed. The world has opened up so much and means of transport become so extensive and so flexible, that nearly everything, both new and old, is competitive.

The problems which arise to-day are so many-sided, and often such a seeming balance of pros and cons, that in the end, despite all the wonderful resources of chemical industry to-day, the decision can come only with a clear-eyed sense of judgment. Enterprise of the future will succeed best on a broad basis.

Chemical enterprise, if it is to be successful, is bound to become larger both in scope and in size of the industrial unit. This tendency brings, perhaps, some new problems in its train, in that chemical enterprise will tend to become a community; it will enlist in its service the chemist, the engineer, the physicist, the labourer, and the artisan. The psychology of this "group mind" will require patient study.

### Leadership.

Then again, there is good leadership. Leadership means much: it means the knack of inspiring a large body of different sorts of people with the same enthusiasm for the same objective, with creation of a constitutional form of government within the undertaking, with making every man, however insignificant, feel that he is an important link in the chain; it means the building up of an organisation which is not only capable of solving its own problems, but of providing its own training ground for its high positions. The industrial leader is surely not he who can brilliantly extricate it from the chaos into which it has drifted, so much as he who, by careful staff work and the considered solution of problems before they occur, can keep it from ever descending into chaos. It is true that the old method seems more brilliant, but the other way is the real way, and is more difficult, since it does not depend upon erratic moments of inspiration.

### Food Supply.

One day chemical enterprise must address itself still further to the ultimate problem of all, *the problem of food supply*. Synthetic fertilisers have done much, and will do more, but is it certain that it is beyond the ultimate grasp of chemical enterprise to furnish that "something," whatever it be, which will eventually and surely cut down the period of time necessary for plant and vegetable growth, and thus make harvests so abundant that succeeding generations may straighten shoulders no longer burdened as are ours? Than this, chemical enterprise, in its vision, can have no better horizon.

### The Fish Report.

The recently issued report by the Imperial Economic Committee on the preparation and marketing of fish, the main conclusions and recommendations of which are given on another page of the present issue, endorses all that we have stated from time to time in our editorial columns. Thus, the report points out that although longer voyages have now to be undertaken, the methods of preservation have not improved equally with those of capture. The methods at present adopted on board ship for preserving fish after capture call for criticism. Storage in ice is objectionable, first, because it is insanitary, and, second, because the fish, on landing, is of very variable quality. The same applies to storage after landing. Hence the fluctuations of wholesale prices, and, as a further consequence, high retail prices. By these steps the Committee reaches its principal recommendation, which is that research should be instituted with a view to improving methods of preserving fish from the moment when it has been caught to the moment when it reaches the consumer.

In agreement with the policy urged by FOOD MANUFACTURE, the Committee considers that this research should be based on a station at a fishery port and a specially constructed vessel. A Canadian station is also recommended.

The Committee can think of no trade in which the co-operation of the scientific man, the engineer, and the business man is likely to yield greater results. No doubt the fishing industry would welcome and would be prepared to assist in a thorough investigation of the best methods of preserving fish at an economic cost.

### Floating Food Factories.

One very attractive way of solving the problem is the provision of a "factory" ship, such as is used in the whaling industry. This is a ship specially equipped for treating fish immediately after capture. It would not engage in fishing, but would be served by a number of smaller fishing vessels. When treated on board, the fish would be despatched periodically to port by a series of carriers. The operations on board the "factory" ship would comprise separating and preserving the edible portion in best condition, extraction of oil from the livers, and, thirdly, the preliminary conversion of the waste into fish meal. Apart from special cases, there is no reason whatever why this division of labour into specialised channels should not meet with the same success as in any other branch of industry.

### Cod-Liver Oil.

We have also referred in these columns to the unsatisfactory practice of treating the livers of cod at the port, instead of treating them on board as is done in some instances. The marketability of cod-liver oil depends very largely on the promptitude with which the livers are steamed and the oil drawn. If, therefore, the oil were extracted on board, its quality and value would be greatly enhanced. The Imperial Economic Committee points out in its report that, apart from the economy to be found, both as regards capital and skilled labour, in separating the functions of catching, treatment, and carriage, the idea behind the use of a "factory" ship is to improve the quality of the commercial products and to avoid waste by performing the operations of separating and treating the flesh, livers, and waste at the earliest possible moment.

### Vitamins in Margarine.

Cod-liver oils are stated in the report to be probably the richest and cheapest source of certain vitamins. In the course of the inquiry conducted by the Imperial Economic Committee, the representative of a large firm of margarine makers stated in evidence that his firm claim they have succeeded in transferring the vitamins from cod-liver oil to the margarine they manufacture, and therefore have improved its nutritive value. They have not incor-

porated cod-liver oil in the margarine, but claim that they are able to transfer the vitamins from this oil to an odourless and tasteless vegetable oil, which they use in manufacturing margarine.

It looks as though cod-liver oil is to become one of the important raw materials of the food manufacturer. There is, therefore, likely to be an expanding market for these oils of high vitamin content and of good marketable qualities. On the other hand, in a letter published in *Nature*, O. Rosenheim and T. A. Webster discuss sources of supply of vitamins A and D, and point out that the liver fats of sheep, calf, and ox contain an average of 10 times the amount of vitamin A as a good Newfoundland cod-liver oil, and from 200 to 1,000 times more than butter. Moreover, they are free from the flavour of fish oils and they are easily incorporated into other fats such as margarine.

Vitamin D can now be produced by irradiation of ergosterol, and irradiated ergosterol is extraordinarily potent, so that the amount to be incorporated into margarine would be extremely small. By a study of the best conditions for its formation in yeast, a practically unlimited supply of ergosterol should be available.

Thus, margarine manufacturers have means at their disposal which should make it possible not only to supply a perfect biological substitute for butter, but a product of constant vitamin content, superior in this respect to natural butter.

### Ethylene Colouring of Fruits.

E. M. Chace and C. G. Church, of the Laboratory of Fruit and Vegetable Chemistry, U.S. Bureau of Chemistry and Soils, Los Angeles, have been investigating the effect of ethylene on the composition and colour of fruits. This method for colouring citrus fruits was patented by F. E. Denny in 1923. Denny has shown that when ethylene is added to the air in which oranges and lemons are stored, a concentration of gas not exceeding $\frac{1}{3000}$ doubles the rate of production of carbon dioxide, and any green colour in the peel is rapidly changed to yellow. This action is physiological, not chemical, and raises the general level of life activity in the tissues. The same applies to tomatoes, apples, potatoes, etc. Owing to the wide publicity given to this ripening effect that the process is said to produce, the investigators attached to the Laboratory decided to publish the data resulting from their work, although it has not yet been brought to a conclusion (see *Industrial and Engineering Chemistry* for October).

The work indicates that there is no change in the composition of the edible portion of citrus fruits brought about by the ethylene method of colouring.

The data on dates are too meagre to permit conclusions to be drawn, but they do not suggest any changes that would not be caused by heat alone.

The astringency of persimmons is destroyed by ethylene treatment. The colouring of persimmons, as well as of other fruits, is accelerated by its use.

The tests on bananas, tomatoes, pomegranates, and avocados have not yet been completed.

### New Developments.

A 20,000,000 dollar merger of the steel and tinplate companies of Northern Ohio is announced, thus bringing together 61 sheet mills producing 500,000 tons annually.

The Potato Products Works, Ltd., of Lubon, Poland, which manufacture potato flour, starch, dextrine, and glucose have increased their output so that they are now working up 1,400 tons of potatoes a day.

### A Busy Foreman.

About two weeks ago a fire occurred at a furniture depository adjoining the factory of Messrs. Gardner and Son, Ltd., millwrights and engineers, of Gloucester. At one time the factory was in considerable danger, but, happily, the fire was checked before serious damage could be done to the buildings and machinery. Whilst the fire was at its worst, a foreman was so engrossed in checking time-sheets as to be totally unaware of what was taking place, despite the fact that he was within a few yards of the blazing warehouse. When told of the fire, he said he thought it was raining!

## Forthcoming Articles

Modern Methods in the Fruit Preserving Industry.—G. Seligman.

Tin Plate in the Canning Industry.—H. Serger.

The Manufacture of Mixed Pickles.—E. Jacobsen.

The Candying of Fruit.—W. V. Cruess.

Margarine Manufacture.—Paul Arup.

Fruit Juice Powder.—H. Lüthje.

Experiments of Interest to Canners.—W. V. Cruess and J. Parcell.

Factors Influencing the Baking Properties of Flour.—T. H. Fairbrother.

Gelatine; Uses in the Manufacture of Foods, etc. Properties, Market Grades, Qualities for Different Purposes, Manufacture.—P. I. Smith and K. Pearson.

Eggs; Production, Grades, Preserving, Uses.—T. G. Joyce.

Food Manufacture in New Zealand.

The Salmon Canning Industry.—Dr. E. D. Clark.

The Caramelisation of Sugar.—Dr. Drake-Law.

Dermatitis.—Dr. Drake-Law.

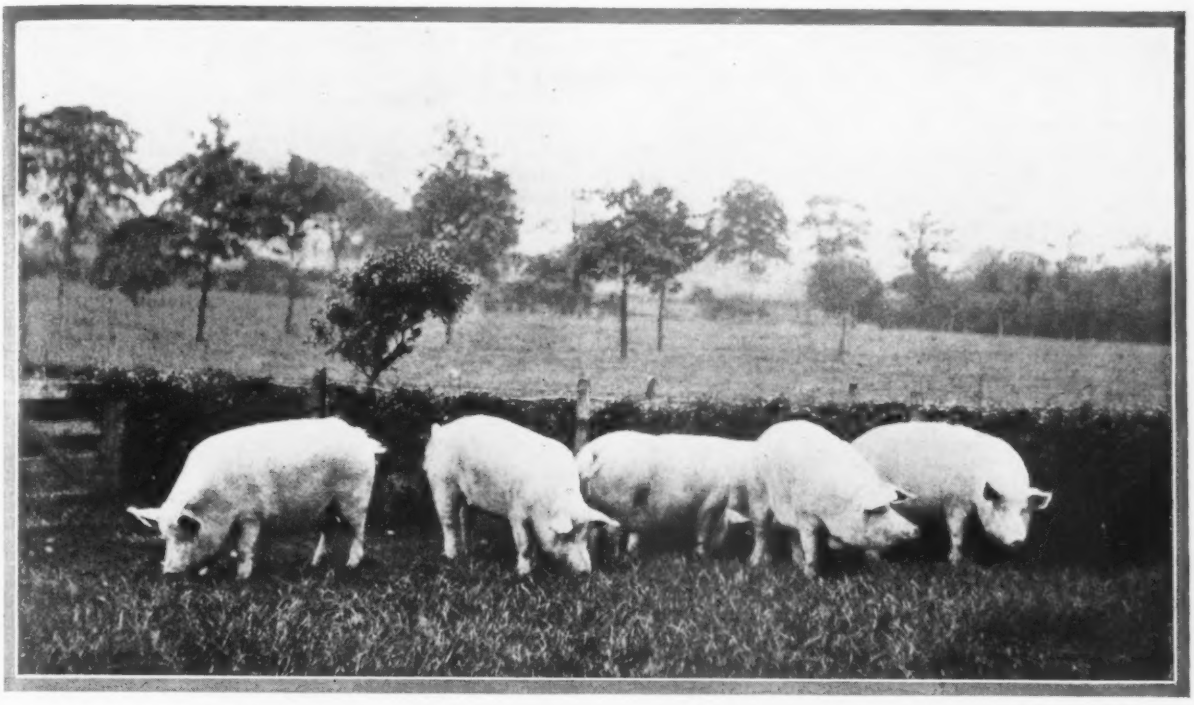
Citrus Fruit Products.—G. T. Shipston.

The Origin and Preventon of Humidity Troubles in a Chocolate Factory.—J. V. Backes.

# By-Products Utilisation by Pigs

By F. W. JACKSON, B.Sc., A.I.C.

*Food manufacturers will find in the article below ideas and suggestions of very great interest and importance. This article is from the pen of a leading authority on the feeding of pigs for commercial purposes.*



THE FOLLOWING ideas are written with one or two main assumptions in the foreground. I am supposing that the majority of my readers are connected with the production of human food; that, secondly, they are engaged in technical management; and thirdly, that amongst their many duties they have to supervise the disposal of by-products, either by using time-honoured methods or by devising new machinery and fresh outlets for them.

Possibly, in some factories there are no by-products. In others, their treatment may be so efficient as not to justify any interference. Nevertheless, instances may be found where a new and perhaps novel means of converting waste material into cash may find some application. In such instances, have the possibilities of the humble pig been taken into account? Is it not possible that, without much dislocation of your scheme of management, you might convert your waste into something which will walk to market on its own legs and is worth one shilling per pound?

## Pigs as Refuse Disposers

A few instances of the practical application of pigs in this direction may be given in order to show that these ideas are not creations of the writer's imagination.

A classical example, of course, is that furnished by Denmark. When this little country (about twice as large as Yorkshire) was considering how to expand her dairying industry some fifty years ago, a serious matter had to be settled with regard to the disposal of the skim milk and whey which would be produced. For every pound of butter there are produced two gallons of skim milk, which is (*a*) useless in its raw state, (*b*) a public nuisance if poured into rivers, (*c*) easily putrefiable, (*d*) expensive to concentrate, but (*e*) a valuable foodstuff. The solution to the problem was found in feeding the skim milk to pigs, and now, with all the advances which have been made in the interim, whether in the matter of refuse disposal or with regard to nutrition, one can but admit the extreme wisdom of this course.

Thus, the huge Danish export bacon trade was originally founded as a side-line, and when one recollects that the butter which Great Britain alone receives from Denmark corresponds to a production of about one million gallons of skim milk *per day!* the importance of the pig in Denmark can be easily realised.

## Other Instances

Other instances of the employment of pigs for consuming waste are furnished by hotels, restaurants, institutions, asylums, schools, hospitals, army camps, and so on, whose edible but uneatable waste is in

most cases fed to pigs. A recent order of the Ministry of Agriculture makes it necessary that all such refuse containing meat shall be boiled in order to prevent the possible spread of foot-and-mouth disease. Such materials are usually called collectively "swill."

To come nearer to my theme, it is but an extension of the above idea to imagine that pigs might conceivably find a more extended use as "scavengers" in the food industry. They are already used in several instances known to the writer in connection with creameries, chocolate, jam and cereals, in which cases they are no doubt giving satisfactory service. In at least one instance the manure from the pigs is applied in the growing of the raw material, thus furnishing another example of those cycles in which Nature works.

### The "Modus Operandi"

A few necessarily brief notes on the details of management must precede a discussion as to feeding.

Pig-keeping really divides itself into two stages, usually called "breeding" and "feeding." Some people specialise in breeding, and sell their weaners at nine weeks of age, or their "strong stores" at twelve to fourteen weeks, to others who concentrate on feeding these to either pork or bacon weight. Naturally, a combination of the two, where possible, is the most profitable. But, so far as the disposal of waste edible matter is concerned, either breeding or feeding can be employed, and a decision must be made with regard to local conditions as to whether it will be more convenient to sell, or alternatively to buy, small store pigs, in other words, to feed sows or young pigs.

### Nutritive Requirements of Pigs

To come to the actual feeding of the pig, this matter is governed by certain broad principles, which must be observed if best results are to be secured. Although the pig is popularly supposed to be capable of eating anything, it is neither wise nor profitable to permit this.

Unsound, decayed and highly seasoned foods are taboo: so also is food containing excess of salt or soda. Materials containing much fibre are utilised uneconomically and comparatively indigestible substances must be avoided.

Apart from these special considerations, the feeding of pigs follows the general lines which are now laid down for all classes of livestock. A reasonable proportion of carbohydrate to protein must obtain in the ration, the usually accepted figures being 4 to 1 for young pigs, gradually widened to 6 or 7 to 1 for fattening pigs. Pregnant sows commence at 6 to 1, and that ratio is narrowed gradually to 4 to 1 as farrowing draws near.

Furthermore, it is now recognised that a considerable proportion of the protein (say about one-third) is best obtained from so-called "animal sources," and feeding stuffs derived from milk, blood, meat, and fish have thus a special value. Other sources of protein which have almost as good a growth-promoting value as the above are peas, beans, soya-beans and peanuts. The proteins derived from wheat, potatoes, and rice should be expected on biochemical grounds to have a rather higher nutritive value than is usually assigned to them.

Lastly, the importance of ensuring a supply of mineral constituents in the diet is now well-known to pig-feeders, although exact information is not yet available on all points. We know, however, that calcium (expressed as oxide) and phosphoric anhydride should each be present in the ration to the extent of 1-1½ per cent. of the dry matter. As the cereals, of which the bulk of the ration is composed, contain considerable proportions of phosphates, but insignificant amounts of lime, it is usually necessary to add to the ration *both* steamed bone-flour *and* ground chalk in order to obtain the above proportion. About ¼ per cent. of sodium chloride is also desirable, and at the same time it is convenient to add about ¼ per cent of fine sulphur and a trace (about 0·005 per cent) of potassium iodine.

There is no need at all for me to dwell in greater detail upon the minutiæ of feeding. Obviously, what is necessary in the case of a by-product is first to know the composition of the material and of its ash, and to have some rough idea of the biological value of its protein, if any. It will then be possible to determine what other feeding-stuffs must be combined with it in order to obtain a satisfactory ration.

### Feeding for Quality

In the choice of these supplementary foods, one further precaution is necessary. An extremely important characteristic in pork and bacon pigs is the texture of the fat. This can be influenced to a very considerable extent by feeding, since it is well-known that if oil or fat is fed to pigs in excessive amounts the surplus is conveyed to the fat depôts, where it may show itself in the carcass in the form of an unduly soft or oily body-fat. In order to avoid this, it appears necessary that the total amount of oil in the ration of growing pigs should not exceed about 2½ per cent. of the dry matter, and the less the better. Oil-seed cakes obtained by pressure, are, in general, ruled out in this way, the extracted meals being far preferable. These precautions with regard to oily foods do not, of course, apply to breeding stock.

### By-Products Already Used for Pig-Feeding

In addition to the materials already mentioned, one may note that the following are popular pig-foods: extracted oil-seed meals of several kinds, blood-meal, bone and meat meal, industrial and milling by-products of maize, barley, and wheat, dried yeast, molasses, and many others.

Finally, it may be pointed out that an ounce of practice is worth a ton of theory, and that the best way to ascertain the suitability of a material for pigs is by means of an actual feeding trial, carried out with certain essential precautions.

The feeding trial is made in order to ascertain the weight of food required per pound of liveweight gain, the liveweight increase per day, and the quality of the carcass, all compared with a control lot of pigs fed on a ration of known suitability.

One may hope that the above remarks, necessarily brief and sketchy though they be, will have shown the possibilities of pigs as being of some assistance to the food manufacturer.

# Food Impurities

By HAROLD R. JENSEN, M.Sc., F.I.C.

*The following article is important in that it discusses the question of the purity of foodstuffs from the standpoint of the industrial chemist. It questions the ideals of certain public analysts. The author finds it difficult to understand that anything but inertia is responsible for maintaining the imperfect and often unjust system, whereby minor and alleged breaches of controversial food impurity standards are subject to consequences which may be more serious than those resulting from fraudulent adulterations.*

TO THE manufacturer, the food chemist, the public analyst, and not least to ourselves as consumers, the purity of foodstuffs—or the freedom from certain measurable impurities, which is a different thing—becomes ever more important.

It is true that we know so little about the subject that the more we learn the less we seem to comprehend. Nevertheless, the public interest demands that food products which attain essential purity must be available for all. Essential purity is not an absolute standard, and it may be defined from more than one standpoint, but here we need only concern ourselves with those instances of entirely foreign ingredients in edible products, either chemical or natural, such as are generally held to be objectionable. These may be either accidental or intentional, and supposedly injurious to health; or they may simply mask value or quality, in which case they are more correctly styled adulterations. This term is very often unfairly applied to those minute and accidental contaminations which come to light from time to time as chemical analysis is perfected, and which are not the result of any commercial objective.

The annual address of the President of the Society of Public Analysts for the current year not only rightly claimed that the purity of the people's food was higher than at any previous time, but also very wisely stressed the value of the common ground long offered by that society to the two branches of the chemical profession responsible for the purity of foods and drugs—the works chemist and the official analyst. It was pointed out that the real aims of each were never so well understood, and that they were complementary and not opposed.

It is, of course, a fact that all chemists desire to secure fair value and description, and that the article shall be wholesome and harmless. It certainly must be emphasised that the community is greatly indebted to the vigilance and high standards of work of the technical chemist on innumerable occasions, whereby a constantly advancing degree of purity and quality is attained, and unsuspected contamination traced and eradicated.

It is not the object here, however, to praise or criticise any particular group of chemists, but at the risk of committing heresy, to question the ideals of certain over-zealous public analysts. Some pertinent conclusions of the industrial chemist may lead to a more careful handling of these food impurity problems.

It is now widely known, from the recent report of the Departmental Committee, that practically all our flour, the "staff of life" itself, has for three decades been subjected to varied chemical treatment, with the minor purposes of influencing colour, texture, water-holding capacity, or the rapidity with which the flour may be used—which treatments can, of course, have a significance far beyond that small residual impurity which may remain in the flour after baking. The chemicals concerned, persulphates, chlorine, nitric acid, etc., were all of high activity. Drinking water, too, after perhaps a needed sterilisation, may still contain one part per five million of chlorine residual, although this very active substance is now prohibited in all foods. Corned and pickled meats, widely treated with saltpetre without restraint, may still contain residual nitrite—a powerful drug—to the extent of one-third grain per pound. Again, froth-forming products, such as quillaia (soap bark), containing highly active poisons, although not sanctioned by the authorities, were, until recently, in considerable use in beverages. On the contrary, infinitesimal and admittedly harmless contaminations with arsenic are the subject of convictions and enormous consequential losses. A cocoa powder, of which 365 cups are prepared therefrom to contain, in all, a single useful dose of arsenic may be illegal. Again, the extensive use of the sugar substitute, saccharin, during the war, proved that its drastic prohibition by some authorities was due to an extremist and probably incorrect view. All of which inevitably makes the plain man ask for some fuller explanation of the system.

As has often been pointed out, the regulations controlling the purity of foodstuffs are not yet derived from a specific Act of Parliament, but under a general provision which permits the Ministry of Health to make the various prohibitions or permissions. The putting into force, from 1927 onwards, of the new regulations for Food Preservatives, itself marks an important development in specifying, by precise schedule, what foods may or may not contain, of substances considered of that nature, even

when the ingredient is not added to effect preservation. It remains to be seen whether this latter circumstance may not yet cause controversy if applied to some constituent not hitherto under discussion. As, for example, "where an ingredient not injurious to health is required for commercial preparation and not fraudulently to increase bulk, weight, measure, etc."

No doubt the recommendations of the Flour Committee limiting the nature and amount of gluten "improvers" which may remain in the flour, will be dealt with forthwith in the same way.

The new Sale of Food and Drugs Bill (1927), with its object of fully legalising by Act of Parliament the numerous administrative regulations and practices, was amended at a late stage in an extraordinary way.

The seller now appears to be deprived even of his right under Sec. 6 (i) of the 1875 Act of proving harmlessness, and therefore permissibility, for substances necessarily present. The Bill now purports to define everything not on the Preservative Schedule to be harmful—which would seem to infringe the principle of common law requiring the fact of harmfulness or otherwise to be decided solely on evidence.

The regulations quoted, with those already in force for butter, milk, and cream products, form a comprehensive basis for controlling, as to purity, a large range of food products. Beyond that, particularly as to new or accidental ingredients, we shall be guided by the general principle—that what is injurious or prejudicial to the purchaser shall be defined by the local medical officer, and often adjudicated on by a layman. How the official is to be guided as to what is or is not harmful might well be the subject of inquiry. In many instances, this can only be the opinion of the individual—that a suspicious ingredient is harmless, when necessary action may not be taken. How very difficult it may be in many cases scientifically to prove small quantities of this or that to be harmful, is well shown by the unsolved problem of the amount of carbon dioxide which is desirable in the air we breathe. In very many cases of impurities, proof of harmfulness has never even been attempted. Clearly it is an unsatisfactory way in which to vest a great responsibility, especially in view of the serious industrial dislocations which can arise from technical and harmless breaches of implied regulations.

It may be stated at once that with many of the materials used in food product compounding, which are handled in great bulk and frequent delivery for continuous use, to test an appreciable proportion of the packages for all conceivable contaminations—as presumed by conflicting standards—is as impracticable as it should be unnecessary. First, there are the exigencies of storage and production to be considered; then with a testing control, not only over raw materials, but also over a range of manufactured products, the work is enormous, in spite of the drastic curtailment which can be effected by long experience and knowledge, coupled with a scientific system of sampling and inspection.

Owing to the causes mentioned, however, with 99 per cent. of bulk materials a risk always remains, with occasional consequences quite out of proportion to any injury to the public, or to the unavoidable character of the offence. This risk is rapidly increasing, and has become very real to the small manufacturer with limited or no testing facilities. It is a risk to the chemist and to the industry; indeed, it is within the writer's knowledge that a chemist was quite unable to clear himself from responsibility for arsenic contaminations (trivial of course) which were found later to have originated from the unknown nocturnal stupidities of a quack insect pest destroyer —and so with many such fortuitous admixtures occurring at late stages.

The immediate result of every extension of purity standards is no doubt to increase the number of chemists, or rather analysts, employed. So far as industry, however, is concerned, it is not realised what a large proportion of the energies and time of chemical staffs is becoming absorbed in what are really "Safety First" duties. The testing of food materials, in many directions, is now so complex and requires such a special technique that a corresponding withdrawal is caused from the vital function of any technical chemist—that of investigations bearing on production and development. A manufacturer may allocate £1,500 a year or so for a laboratory establishment, but neither logic nor advice is preventing a most wasteful diversion from more valuable productive work to that of routine testing which the threat of prosecution necessitates.

Thus, even on the narrow view, the employment of chemists is not at all advantaged by the system in force.

Considering one widely prevalent, but spectacular impurity, arsenic, concerning which the public, and even the analyst, are extraordinarily nervous, the law is peculiarly zealous with this substance where foods are concerned, but much less so with the large quantities broadcast in careless horticulture, etc.

No pharmacist, experienced in the dispensing of medicine, where, so frequently, long substantial courses of arsenic are given with marked advantage, even to invalids, could ever be persuaded that there is any serious scientific evidence for the extreme theoretical standard of the Public Analyst—viz., the conventional limit of one-hundredth grain per pound. This standard would require (of foods other than milk, sugar, bread, and meat) four pounds per day to provide one average harmless dose.

The application of this rigid standard to even the minor constituents of a foodstuff—a component of a baking powder equally with a flour, with a dye containing only one part in 100,000, as with a confection, and so on—regardless of the actual quantities consumed, is obviously inconsistent.

As to the argument that foods are in quite a different category to medicine, it can only be said that often they are physiologically one. In fact, the harmless, if not beneficial, administration, would often be the high dilution and fixation of arsenic, etc., in foods, rather than straight doses of higher concentration.

Legal procedure is at present also compelled to ignore the fact that the toxicity of arsenic (and antimony) is notoriously variable according to its combination, the general tendency being for complex combination to reduce its poisonous intensity, as in Salvarsan to one fourth or in the cacodylates to one

fourteenth—an exception being cacodyl itself and the hydride whose vapours have a toxicity greatly increased.

Finally, the recent conclusive investigations of A. C. Chapman and others, into the inevitable and considerable "natural" occurrence—far beyond the legal limits—of arsenic (and lead and copper) in practically all sea water fish foods, shows the need for some elasticity in our imperfect standards and legal ideas.

It is possible, moreover, that this natural *arsenic* occurs in a fully toxic form. The following were the average arsenic quantities discovered in portions eaten, in parts per million—the legal maximum being 1·4 parts: Lobster, 55 parts; cockles and mussels, 50 parts; native oysters, 5 parts; flat fish (plaice, etc.), 6 parts. *Copper* was found in lobster and crab 3½ parts, and in oysters much higher, and of *lead*, oysters contained 27 parts and lobster 3 parts, with, in every case, occasional values very much higher. This, of course, is no argument for the removal of all legal checks on unnatural impurities, but it is a striking illustration of our incomplete knowledge of the whole subject of food and its accessories with their gland and hormone adjustments. It surely proves the need for keeping an open mind on all these minute ingredients, and not simply blindly to exclude the few which happen to be measurable in parts per million.

In the further sphere of copper, zinc, tin, and lead, which are also widespread in minute quantities, and often unavoidably with mass production, the position is even more vague and controversial, and there is very little guidance thereon from the reports of the various Commissions.

Jams, for example, very frequently contain minute traces of copper arising from the unavoidable effect of acids on the pan during cooking. It has been alleged that the often occurring content of three parts per million transgresses some theoretical limit of harmfulness, and is therefore illegal. Such a content would actually mean that a single safe adult dose of copper would be present in a year's consumption of jam.

On the other hand, cocoa powder has a "natural" and unalterable average copper content of forty-eight parts per million. Although this proportion would provide as much copper in three months as did the "illegal" jam in twelve, obviously the cocoa cannot be the subject of any legal complaint. This again illustrates the illogical nature of the standards applied to foods.

The only fact that appears to emerge is that in spite of considerable and continuous consumption by all sorts and conditions, a direct harmful effect is practically never traced to quantities of impurities quoted very many times greater than those classed as illegal by some courts.

It is agreed that certain metallic poisons are injurious or undesirable in constant definite doses, which is a different proposition to the homœopathic guesses of some medical officers and analysts, who are not aware of the normal resistance of the body. The difficulty, of course, is to know where to draw the line, when perhaps long-delayed injuries to the body result from the ingestion of frequent small quantities of chemical substances. This seems to be a subject of sufficient importance to us all for extensive research.

Nevertheless, an exaggerated and unreal position has developed, and this may be deduced from the common knowledge that neither academic chemical circles, nor the practising physician take the slightest interest in these rather theoretical food impurity doctrines, nor do they concern themselves with such in their own diets.

It is, therefore, difficult to understand that anything but inertia is responsible for maintaining the imperfect and often unjust system, whereby minor and alleged breaches of controversial food impurity standards are subject to consequences which may be more serious than those resulting from fraudulent adulterations.

As long ago as 1896, the creation of an expert Court of Reference was advocated. Before such a central tribunal manufacturers ought to be able to give explanations of complaints lodged as to undetected and insignificant quantities of ingredients (otherwise undesirable), and forthwith comply with any instructions then laid down. In this way the frequent injustice from the crude publicity of prosecution would be avoided; regulations could be fully maintained in accordance with current scientific knowledge and the real advantage of the public better secured than at present.

That the establishment of such a court is long overdue is incontestable. It has actually been endorsed by analysts, the Food Federation (December, 1924), and Government Committees, and the principle is definitely recognised, as to local authorities, prior to proceedings under the Preservative Regulations. Coupled with this reform, there seems to be a real need for establishing an economical testing system further back in the distribution of many raw materials. By means of a system of indexes, specifications and seals, some reduction in the number of overlapping tests with an infinite number of packages could be effected. Such economy might well be diverted instead of a more thorough scientific study of the materials. It is for the trade federations to organise this useful proposal.

Together with this, some progress ought now to go forward, in the directions described, for international standardisation of quantities and analytical measurements, in connection with the more important raw materials used in foodstuffs.

Finally, it is questionable whether the conditions under which much meat and fish food is exposed and distributed in many poor city areas—conditions as to age and wholesomeness which can make one shudder—do not point the way to a need for a purity far more pressing than the precise requirements of the analyst.

IT is of interest to note that during the portion of 1926, from April to November, when the preservative regulations were not in force, 77 per cent. of the samples of margarine received for examination under the Food and Drugs Act, 1899, contained boron preservative, whereas this substance has not been found in any of the samples received since the beginning of December

# The New Chewing-Gum Factory

THE JUNE issue of FOOD MANUFACTURE gave some particulars and photographs of a modern food factory (the Shredded Wheat Factory at Welwyn Garden City, Hertfordshire), designed and equipped on thoroughly up-to-date lines. Another example of a British factory of the same class is the one recently erected by Messrs. Wrigley Products, Ltd., adjacent to the L.M. & S. Railway at North Wembley, London.

The five-story building occupies some 50,000 square feet, and has a superficial floor area of 190,000 square feet. As in the case of Shredded Wheat Factory, special precautions have been taken to ensure great cleanliness and good lighting, day and night. For the latter purpose, the building is fitted with large windows and Mazda lamps. The same care has been given to the lay-out of the conveying plant and machinery in order to ensure maximum efficiency in packing and despatch.

Briefly stated, the process of manufacture of Wrigley's Spearmint chewing-gum is as follows: The raw gum is crushed, and then weighed on to trays, which are transported to the conditioning room until ready for the next operations. These consist in heating the material in rotating steam kettles and refining in a special machine under enormous pressure. The above operations are carried out on the top floor of the building, and the refined gum descends by gravity to the next floor below, where it is kneaded, the flavouring added, and then rolled into sheets and cut into the little strips characteristic of the product.

Sugar Mills.

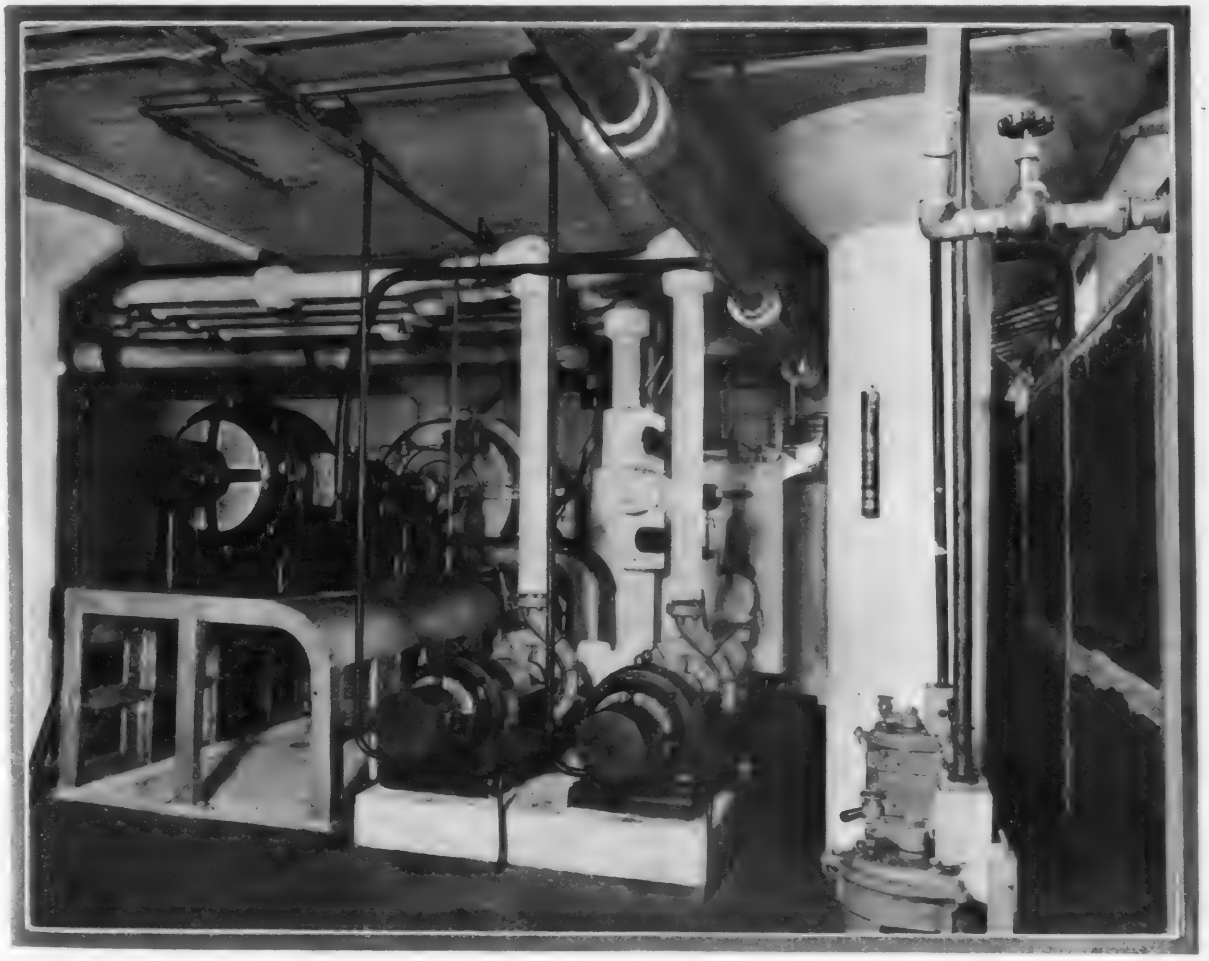
Raw Gum Crusher.

For the manufacture of the sugar-coated pieces designated "P.K. chewing sweets," the process is similar during the earlier stages, but after the sheeting operation small pieces are cut and transported to revolving pans, where very finely ground sugar is added. Each piece thus gets its coating of sugar, a little at a time, until the required thickness is obtained. A large number of applications are necessary, and the most careful grading is carried out between each operation. These pieces are then ready for packing after being passed through an ingenious machine which imparts the glazed and

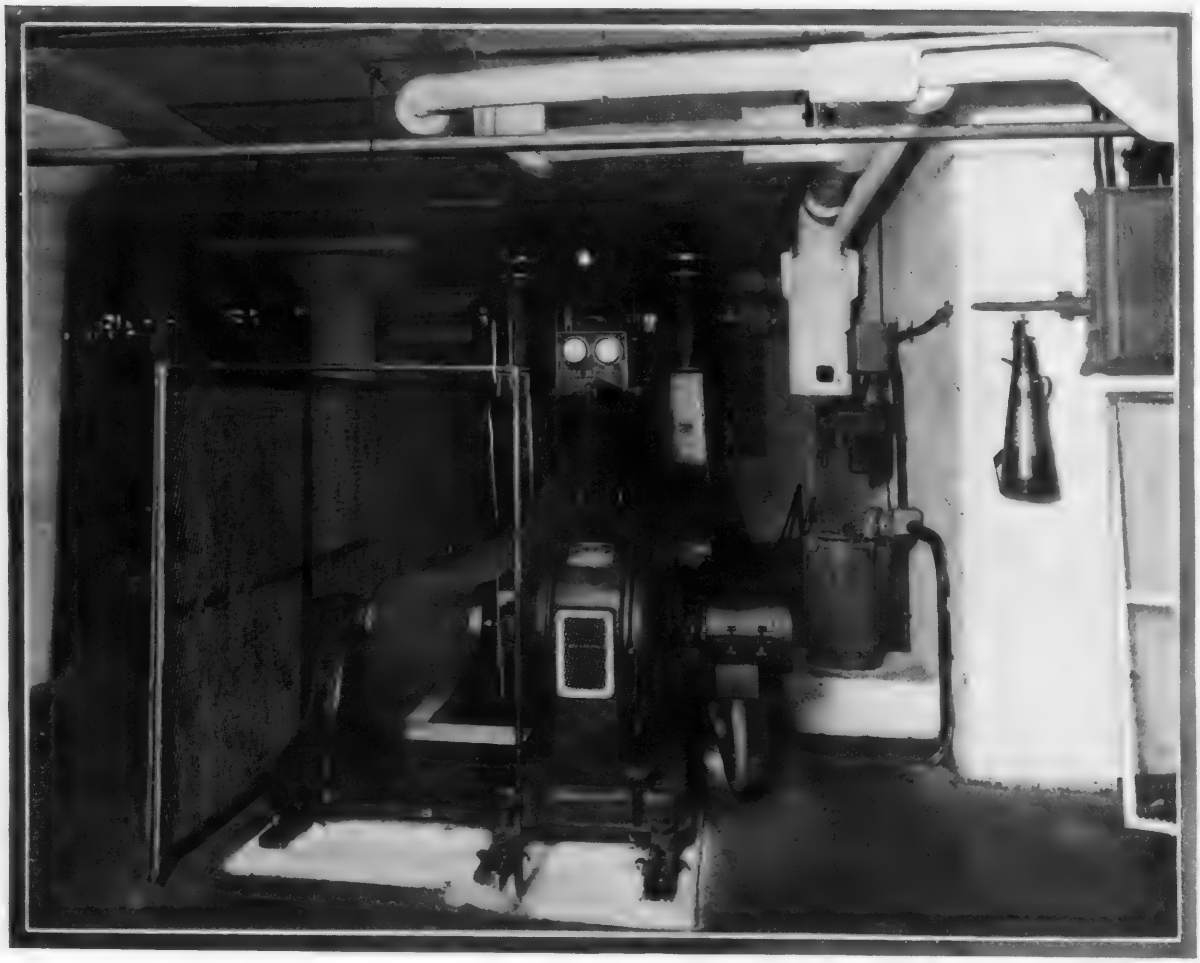
polished effect that is a feature of this sweet. The same machine also carries out final grading and rejects all pieces which happen to be in any way faulty.

Both the Spearmint and P.K. pieces are wrapped and packed by automatic machinery. There are two other features of the general lay-out which should be mentioned. The machinery is motor-driven, the total horse-power of the motors being 1,250. The motors vary in size, from 175-h.p. down to those of fractional horse-power rating, and as a general rule, the various machines are individually driven. This is an advantage in that any particular motor can be shut down instantly when not required, and as readily started up again at a moment's notice. Thus, power need only be taken from the supply mains (the 415 volt, three-phase, 50 cycle mains of the North Metropolitan Electric Power Supply Company) when the machines are employed on useful work. Other advantages are the elimination of long lengths of shafting and the facilities offered for mounting the motors in any position which may be most convenient. It is interesting to note that the motors, together with their starting and control equipments, were manufactured by the British Thomson-Houston Co., Ltd., of Rugby.

The other feature of the equipment to which attention should be drawn is the elaborate air conditioning plant installed by the Carrier Engineering Co., Ltd., to ensure the various operations being carried out at specific temperatures and humidities. The equipment illustrated is used in connection with the coating department.



**On the left, a B.T.H. Motor of 175 H.P., and in the foreground, two of 17·5 each, Driving a "Carrier" Air Conditioning Plant.**



A B.T.H. Motor of 75 H.P. Driving an Ammonia Compressor.

# Wheat and Bread Prices

ON THE authority of Mr. W. M. Jardine, Secretary of Agriculture for the United States, the Canadian Wheat Pools are responsible for an increase of 18 cents in the price of wheat received by Canadian farmers. So far as the cost of the loaf is concerned, Mr. Davisson shows that the lowest price in Birmingham, England, since 1922 was 8d. in November, 1925, and the highest 11d. in February, 1925. In May, 1926, it was 10d. and in September 9½d. The price as we write is 9½d. The loaf on the average has been a little dearer from October, 1924, down to to-day, than it was from January, 1922, to August, 1924, although Mr. Davisson seems inclined to show otherwise and says that "organised growers have no designs on the bread-dollar in the world's cities." Maybe, but Mr. Davisson gives the milling margin on 1923 wheat as 5·31 per cent.; transportation 3·21 per cent.; freight charges 1·70 per cent.; elevator charges 1·38 per cent., whilst the farmers' percentage was 16·37; "other materials" 13·88; retailers' 22·22, and bakers' 35·93 per cent. If the farmer gets a bigger percentage, then bakers or consumers must suffer in the long run, and we note with regret that the consumer is the last person considered. For example, the recent reduction in grain freights recommended by the Canadian Railway Board was immediately described as "a victory for the farmers." This implies that railways must lose revenue, but farmers gain, whilst consumers are out of the picture. The London *Financial Times* said this month: "As elsewhere, farmers in Canada are much given to grumbling and probably nothing short of free transportation would completely satisfy them . . . their best policy is to make the most of the concessions now made to them and to abandon all ideas of securing subsidies at the expense of either railway owners or taxpayers."—*Canadian Export Pioneer.*

# Bacteria and the Canning Industry

By R. F. HUNWICKE, B.Sc. (Lond.), A.I.C.,
*Bacteriologist at the Glaxo Research Laboratories. Formerly of the Food Investigation Board.*

## II—CONDENSED MILKS

*In a previous article the types of micro-organisms which are associated with the spoilage of canned meats and fish were discussed. It was shown that in this class of canned foods the enemies of the canner are to be found among the bacteria, and that yeasts are hardly implicated.*

IN THE present article, however, yeasts will take a prominent place, and it may be well at the beginning to say something with regard to this type of micro-organism in general.

### The Yeasts

It may not be generally recognised that there are many varieties of yeasts, possessing different characteristics, just as there are many species and varying strains of bacteria. In the first place there is the great sub-division into the two classes: Saccharomyces, or true yeasts, and Torulæ, or wild yeasts.

Yeasts do not multiply by simple division like the bacteria; they multiply ordinarily by "budding," that is to say, a yeast cell will throw out a small process from its side which grows and ultimately forms a daughter cell, splits off and becomes a full-sized yeast cell, and begins to "bud" in its turn. The torulæ, or wild yeasts, multiply by budding only, but the true yeasts also under certain conditions form spores which are capable of generating new yeast cells.

It is exceedingly difficult to demonstrate these spores under the microscope, and a special technique is necessary, but the writer was on one or two occasions lucky enough to come across them by chance. They present rather a striking appearance under the microscope, looking like a pyramid of three billiard balls enclosed within the yeast cell. No more need be said of them here.

Most of the true yeasts grow in white colonies, often having a beautiful porcelain-like surface. Other colonies present a rough or matt appearance. Many of the torulæ grow in bright pink colonies. Generally speaking, the torulæ do not ferment the sugars, consequently they are not nearly so important from the present point of view as the true yeasts, many of which have strong fermentative properties.

Yeasts may further be classified by the shape of their cells, some being almost spherical and others markedly ellipsoidal. The torulæ are very frequently much elongated in shape.

The two classes of condensed milks will now be considered separately.

### Sweetened Condensed Milk

In this product it is not attempted to secure preservation by complete sterilisation. Sweetened condensed milks are never sterile. Reliance is placed on the high viscosity of the product to prevent multiplication of the bacteria which have survived the preliminary pasteurisation and subsequent condensation. It may be remarked here that the text books often state, and the opinion is generally held, that it is the high content of cane sugar which preserves condensed milk. This is not so. It is the physical condition of the product, the high viscosity, which prevents the bacteria from multiplying, and not any chemical action of the sugar. Savage and Hunwicke (Food Investigation Board, Special Report No. 13, 1923) show that bacteria multiply readily in ordinary milk containing 50 per cent. of cane sugar. After seven days a 50,000-fold increase was observed. The absence of air is also an important factor, perhaps more important than the viscosity, as will be seen later.

Since, then, sweetened condensed milk invariably contains living micro-organisms, it is of importance to know which are the types most likely to cause spoilage, and what are the conditions necessary to set their activities alight.

(*a*) YEASTS.—These are almost invariably the cause of "blowing" in sweetened condensed milk. Out of thirty-three blown tins examined by Savage and Hunwicke, thirty were found to contain yeasts, and the evidence was clear that the condition was due to the yeasts in every case.

The whole problem of spoilage by yeasts is very complicated, and only the briefest summary can be given here. It should be stated that the mere fact that yeasts of fermentative type are present in a tin does not mean that the tin will of a certainty become blown, though this is the prevailing belief.

It has been shown that by far the majority of perfectly sound *freshly made* samples contain living fermentative yeasts, yet show no signs of blowing even after prolonged incubation. On the other hand, samples which have been some time on the market rarely contain living yeasts on examination.

Now, as in the case of canned meat, so also in this case, it is the conditions of oxygen supply within the tin which are so vitally important. There is a tendency to regard the matter of air-tightness of sweetened condensed milk tins as of less importance than in the case of other canned foods, because of the belief, referred to above, that the high sugar content will inhibit growth. Therefore, though it is intended to keep the tins air-tight as far as possible, no very

great stress is laid on the point. Actually, it is a point of the very highest importance. If a little air gains access to a tin it enables the few yeasts present to multiply sufficiently to produce enough enzyme to break down the saccharose and produce gas. Once this has happened the fermentation is practically independent of the oxygen supply; the yeasts need not go on multiplying materially, but their enzymes can steadily produce gas. Air-tightness of the tins is thus of paramount importance, and a type of tin should be selected which is air-tight and remains air-tight.

It is, of course, also necessary to ensure thorough pasteurisation by the "holding" method; to avoid contamination when the milk is run over the cooler, and to observe scrupulous cleanliness in the various tanks and vacuum pans. Pipe lines should be capable of being taken apart and cleaned with hot soda solution each day. Passing live steam through them is not sufficient.

(*b*) ANAEROBES.—These are not of much importance in sweetened condensed milk, which is fortunate, since B. Welchii is so prevalent in the ordinary milk supplies, and its spores are so resistant to heat. Apparently anaerobes are not able to multiply in this medium to any extent.

(*c*) GAS FORMING AEROBES.—Experiments have shown definitely that organisms of the B. Coli type can multiply in high percentages of saccharose, but not in sweetened condensed milk. It is an unfavourable medium.

(*d*) SPORING AEROBES.—These have been shown to play a very insignificant part in decomposition of sweetened condensed milk.

MICROCOCCI are almost invariably present. They are often rather resistant to heat, and many strains can multiply in sweetened condensed milk. They are not, however, of any importance as causes of spoilage.

It will be seen how overwhelming is the importance of the yeasts as causes of spoilage in this class of canned product.

## Unsweetened Condensed Milk

A very different state of affairs is met with in this product. Here we have a food which is sterilised in the tins, and a food, moreover, which is in an unstable colloidal state, which makes it particularly difficult to sterilise efficiently without at the same time causing undesirable changes to take place.

Whether sterilisation as ordinarily practised is really efficient is open to doubt, for spoilage of unsweetened condensed milk is, as we shall see, mainly due to micrococci and non-sporing bacilli, types which are fairly easily killed by heat. Unfortunately, the concentrated milk is a poor conductor of heat, differing in this respect very markedly from ordinary raw milk, and it is no doubt partly due to this that complete freedom from bacteria is somewhat difficult to achieve.

The following are some facts relating to the effect of different types of bacteria on unsweetened condensed milk:

(*a*) SPORING AEROBES.—The proteolytic properties of this class of organism suggest that they might be likely to cause decomposition of the milk, though not "blowing." But while ordinary milk is clotted and peptonised by these types, condensed milk, owing to the colloidal changes resulting from concentration and sterilisation, is but little affected. Sporing aerobes can grow and multiply in it, but they do not cause clotting or peptonisation.

(*b*) ANAEROBES.—Somewhat unexpectedly, these organisms are not frequently found in unsweetened condensed milk. It is only when the spores are present in great numbers, and especially when present in association with other organisms, that they are likely to multiply and decompose the milk. When this does occur, "blowing" is likely to take place, for these anaerobes are practically all gas-producing organisms.

(*c*) NON-SPORING, GAS-PRODUCING BACILLI.—Organisms of the B. Coli are sometimes the cause of "blowing." Such strains have the effect of clotting the milk, and at the same time fermenting the lactose with the production of gas. Proteus strains are seldom met with. (Proteus differs from B. Coli by the fact that it is proteolytic as well as gas producing).

(*d*) YEASTS.—These are of practically no significance in connection with unsweetened condensed milk. Strains which ferment lactose are not common, and in the unsweetened variety we are not dealing with a product containing 30 per cent. of saccharose, as in sweetened condensed milk.

(*e*) MICROCOCCI.—These organisms are associated more frequently than any others with spoilage of unsweetened condensed milk, and strangely enough are often associated with "blowing." This is not what one would expect, for in the ordinary culture media no gas is ever produced with any of the sugars, though acid production is common. Savage and Hunwicke, however, showed in a series of experiments that, when more delicate tests are used, quite considerable quantities of gas are produced. This gas is not hydrogen produced by the action of the acid on the tin of the container; it was shown to consist entirely of $C\Theta_2$.

(*f*) COCCOIDAL PLEOMORPHIC BACILLI.—These might more properly be included with non-sporing bacilli, but they are rather a special class, and in some respects behave like micrococci. When seen in a microscopic preparation of the milk itself they appear as long, slender filaments, but when grown on the ordinary laboratory media they become coccoid, and are hardly distinguishable from micrococci. Like the latter, they do not produce gas when cultivated in the ordinary sugar broths, but they can, and do, produce it under more delicate conditions of experiment, and are undoubtedly sometimes associated with spoilage of unsweetened condensed milk by "blowing."

## General Considerations

Care must be taken to guard against the survival of non-sporing bacilli, and especially of micrococci. Processing must be carried out at temperatures and for periods which ensure the destruction of these organisms. Leaks, as always in canning, must be most carefully guarded against, because of the admission of air with the consequent onset of activity

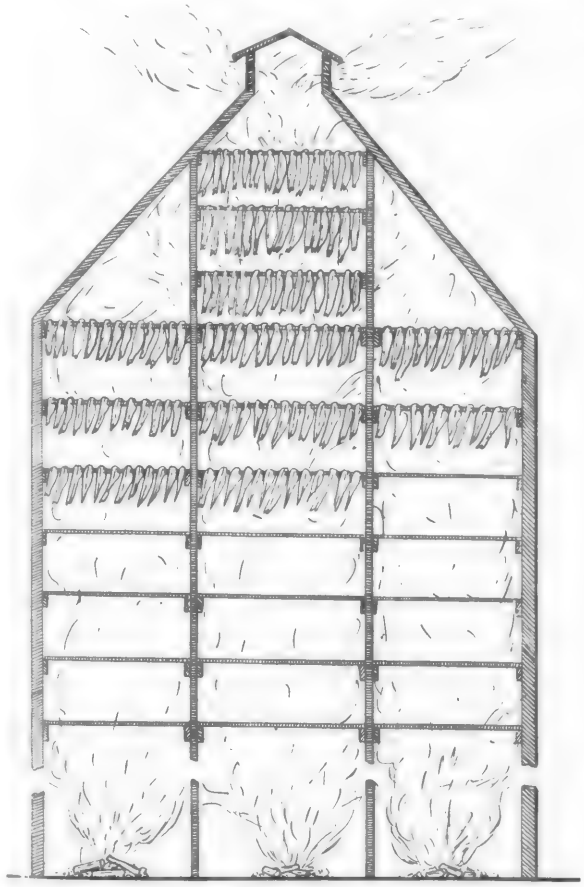
(*Continued on page* 184.)

# The Herring Industry

By W. E. GIBBS, D.Sc., F.I.C.,
*Director of the Research Department, The Salt Union, Ltd. Author of "The Fishing Industry."*

## PART III—SMOKING

*Part I of this series outlined the fishing methods employed to-day, and discussed the influence of various factors on the appearance, quality, and food value of the herring. Part II described the process of gutting and salting, and also dealt with the influence of the quality of salt used and the causes of the development of the "rusting" of herrings and the "reddening" of cod. The article below gives an account of the preparation of red herrings, bloaters, and kippers. By far the greater proportion of the herring catch is sold abroad. The herring is by no means as popular in our country as it might be, despite the fact that it is perhaps the most nutritious, attractive, and abundant of food fishes. There is no shortage of supplies. The problem is to open up new channels of export and to increase the home consumption of herrings, whether fresh, canned, or salted.*



**Diagrammatic Sectional View of Herring Smoke-House.**

### Red Herrings

RED HERRINGS are mostly exported to the Mediterranean and the Levant. In order to keep in these comparatively warm climates, they must be smoke-cured as well as salted. The herrings are first of all salted in concrete tanks, which are generally arranged below the floor of the curing house. The fresh fish and the salt are thrown in together and left for at least five days to develop their pickle. In some cases, according to the conditions of trade, they may be left in the concrete tanks for months before being smoked.

The fish are removed from the tank as required, and, after being washed, are put on "speets" and smoked. A speet is simply a skewer about 3ft. 6in. long. From twenty to thirty fish are threaded on each speet through the gill openings and the mouth. The speets are then stacked horizontally on racks in the smoke-house "loves" (lofts) about six inches apart and about twelve inches above each other, until the smoke-house is filled from the roof to within a few feet of the floor. A fire of oak turnings, shavings, or sawdust is then kindled on the floor. This produces a very resinous smoke, which gradually dries the fish and thoroughly permeates it with antiseptic substances such as guaiacol and creosol, that distil from the burning wood. Care must be taken—particularly in warm weather—to prevent the fish from becoming overheated, and so half cooked and soft. Generally speaking, the fish are smoked for about ten days.

### Bloaters

There are two kinds of bloaters: those intended for the home trade, and those intended for the Mediterranean trade. For the home trade, the herring is lightly salted by immersing it in brine for two hours or less; it is then dried in the smoke-house for one night. The smoke does not actually cure it, it simply dries it superficially and gives it a slight flavour. For the Mediterranean trade, the fish are salted in concrete tanks, precisely as for red herrings, and are then smoke-dried for two days.

### Kippers

Kippering is the only process in which the fish are split before being cured. The herrings are split down the back, close to the backbone, and are then gutted and thrown into large, open baskets. The basket and its contents are washed in a tank of running water to remove blood and slime. The fish are then thrown

into brine in large tanks, until the tank is full. Salt is then sprinkled on the surface, and the fish are left for about an hour, until they are lightly salted. They are then hung on kipper-speets and smoked overnight. A kipper-speet is a square, wooden bar, to which small hooks are fastened at intervals along two opposite sides. The split herrings are opened out and impaled upon the hooks, so that each speet carries about eight or nine herrings on each side. The next morning the kippers are taken down and packed in boxes.

The food value of the herring is increased about fifty per cent. by the salting process. This is due to the removal of water from the flesh, as shown in the table (see page 92). The fresh herring has a food value of about 700 calories per pound, whereas that of a salt herring may be as much as 1,100 calories per pound. That of a red herring is slightly more, owing to the removal of a further amount of moisture by prolonged smoking. Bloaters and kippers, on the other hand, are only lightly salted and lightly smoked, and, therefore, possess practically the same food value as that of the fresh herring. The vitamin content of the fresh herring is unimpaired by the salting process.

### Conclusions

By far the greater proportion of the herring catch is sold abroad. It is a curious thing that, although the herring is perhaps the most valuable, as well as one of the most attractive, food fishes, and is at the same time so abundant round our coast, it is by no means as popular in our country as it might be. This may be due in part to wrong methods of cooking. The best results are obtained when methods are used—for example, grilling or frying—which preserve the oil content of the flesh. When a fresh herring is boiled, the oil globules burst and the oil passes into the water in which the fish is being cooked, with a consequent loss not only of food value, but also of flavour.

It is perhaps unfortunate that the herring catch is seasonal, so that for a short time in the year enormous quantities are landed and have to be kept for distribution throughout the rest of the year. It is inevitable that the fish must be preserved in some way, and, until recently, the only way in which this could be done was by saturating them with salt. The flavour of such heavily salted herrings is perhaps too strong for the British palate, since our normal diet already contains an adequate proportion of salt. In other countries, notably Russia, Germany, and Poland, where the normal diet tends to be deficient in salt, these salt herrings are in great demand, even the pickle itself being consumed with them as a kind of sauce.

Of recent years attempts have been made to extend the consumption of fresh herrings by putting large quantities into cold storage, and also by canning them. Large herring-canning factories are established in Newcastle and elsewhere, and no more attractive or valuable food could be obtained than herrings canned in tomato sauce.

Over ninety per cent. of the total herring catch was exported, mostly in the salted condition, before the war. The greater part of this went to Russia and Germany. Since the war the Russian trade in herrings has not been resumed to any appreciable extent—primarily, because the Russians were unable to pay for the herrings. It is increasingly important, therefore, that new channels of export should be discovered, or that the home consumption of herrings, whether fresh or canned, or even salted, should be developed. The problem of the fishing industry as a whole is to bring about an increased consumption of fish, for there is no shortage of supplies. This problem is even more acute for the herring industry, which depends for its existence upon the sale of a cheap product in enormous quantities. It is a strange irony that the herring, which has such a high food value and is at the same time obtained so cheaply, cannot without great difficulty be sold in sufficient quantities to make the industry a profitable one.

# The Preparation and Marketing of Fish

THE FIFTH Report of the Imperial Economic Committee on Marketing and Preparing for Market of Foodstuffs Produced within the Empire has recently been issued (price 6d., H.M. Stationery Office, Adastral House, Kingsway, London, W.C.2). This report deals with fish, and the following is a copy of the summary of the main conclusions and recommendations:

1. Profitable sea fishing is mainly confined to waters of less than 200 fathoms depth; the fishing grounds though though large are well-defined.

2. Different portions of the Empire are well-placed geographically as bases for fisheries for most of these grounds. A prosperous fishing population is of obvious importance to a widespread Empire dependent on sea communications.

3. Although the productivity of fishing grounds may vary from time to time and there is a possibility that some of them have been overfished, there is no evidence pointing to a shortage in the total fish supplies of the world. Valuable grounds in several regions are at present only partially worked. The limits to the range of fishing are fixed by the extreme perishability of fish, and by the fact that methods of preservation have not been improved equally with those of capture.

4. There are only two parts of the world where fishing industries have been developed on a really great scale, the North Atlantic and the North Pacific—the North Atlantic is the more important.

5. The total value of fish of British catching landed in Great Britain in 1925 was over £19,000,000.

6. The total payment for fish other than of British catching imported in 1925 into the United Kingdom and retained for local consumption was £9,250,000. Of this, £2,500,000, or 27 per cent., was paid to Empire countries.

7. Of the imports valued at £9,250,000, over £5,250,000 represented the value of canned fish.

8. From the Empire the chief imports are canned

salmon, canned lobster, canned crayfish, and salted cod. Refrigerated salmon and haddock are also sent from Canada and Newfoundland.

9. The demand in the United Kingdom is chiefly for fresh fish.

10. Fresh fish is divided into two classes, white fish, of which the cod, haddock, hake, sole, turbot, and plaice are examples, and "pelagic" fish, such as herring and mackerel. The distinction rests on a difference in the habits of the fish, which govern the method of catching, and also on a difference in the character of the flesh. As a result there are two almost separate trades in fresh fish.

11. A marked change in the nature of the demand for fish in the United Kingdom has become apparent in the last few years. The *per caput* consumption of white fish has increased and that of herring has decreased.

12. Except for the requirements of a small export trade in salted cod, all the "white" fish landed in the United Kingdom, whether caught by British vessels or imported, is consumed locally. The demand is expanding, and with lower prices, better average quality and more regular supply is, in our opinion, likely to expand further.

13. At present the increase of demand has been met by increased imports from foreign sources.

14. British vessels fishing for white fish, although they have not of recent years increased the quantities landed, have yet found it necessary to frequent more distant grounds.

15. Having in view the longer voyages now undertaken, the methods at present adopted on board ship for preserving fish after capture call for criticism.

16. The practice of storing fish in ice is open to sanitary objection, since the water from melting ice rapidly becomes infected with bacteria. Another result is that the fish is of very variable quality at the time of landing according to the length of time after capture.

17. Better methods of preservation, if they can be developed, are of no less importance for the storage of fish after landing. Under present conditions fish must be promptly sold whether there be a glut or scarcity, with the result that wholesale prices are subject to rapid and wide fluctuations.

18. If fish could be stored on board ship or on shore in practically "live" condition for reasonable periods, the supply and the prices could be stabilised.

19. The investigation of retail prices and their relation to wholesale prices we have regarded as proper to the functions of the Food Council—the domestic authority in Great Britain—but we as an Imperial Committee are bound to take cognizance of the reaction of retail prices on demand, and it is evident that unduly high retail prices limit consumption.

20. Excessive fluctuations in wholesale prices are undoubtedly one of the causes of high retail prices, in that the retailer will protect himself against such fluctuations by setting his prices on the high side of the average.

21. These excessive fluctuations of prices on the wholesale market greatly increase the commercial risks attached to the despatch to the British market of fresh and refrigerated fish caught off the Newfoundland and Canadian coasts and thereby discourage this branch of Inter-Imperial trade.

22. It follows, from the preceding paragraphs, that anything which will stabilise wholesale prices must have a healthy effect on the whole trade. We believe that the first essential, the *sine qua non*, for all improvement of organisation lies in the study and application of better methods of preserving fish at an economic cost.

23. So we reach our principal recommendation, which is that research should be instituted with a view to improving the methods of preserving fish from the moment when it has been caught to the moment when it reaches the consumer.

24. We think that this research should be based on (*a*) a central station at a fishery port in Great Britain; (*b*) a specially constructed vessel, and (*c*) a Canadian station in the Maritime Provinces, in which last we hope that the Newfoundland Government as well as the Canadian Government might be interested. We have commended the central station and the vessel to the initiative of the Empire Marketing Board.

25. Two stations, one on each side of the Atlantic, would, in our opinion, be sufficient, and we do not recommend more because a concentration of co-operating specialists and appliances is needed, and the best results from such expenditure as can be afforded are, in our opinion, likely to ensue from the arrangement which we have indicated in the last paragraph.

26. We have further suggested that the Governments of the United Kingdom and of Canada should encourage co-operation and correlation between the two stations, in order to cheapen costs and secure more rapid results, and in view of the interests of the Irish Free State and Newfoundland in the North Atlantic fisheries, we hope that they will endeavour to enlist the active interest of the Governments of those countries.

27. The expense of these schemes should, we think, be borne in the first instance by the Governments, but as the experiments progress and take the shape of trials on a commercial scale, which, if successful, would develop into reorganised methods in the industry at large, we are of opinion that the trade (which will profit) should be called upon for an increasing share of the cost.

28. This problem of the effective preservation of fish does not merely concern the fisheries of the North Atlantic. Off Australia, New Zealand, South Africa and in the Tropics there are valuable fishing grounds, as yet only partially worked, the full development of which may be retarded by the absence of better methods of preserving fish.

29. The interest of these parts of the Empire in the prosecution and progress of the research which we have recommended should be borne in mind.

30. The herring trade is faced by a loss of markets both in the United Kingdom and abroad. Before the war the *per caput* consumption in the United Kingdom was one-third that of white fish, to-day it is one-fifth; and the exports in 1925 to the markets of Central and Eastern Europe were 4,000,000 cwts. less than in 1913.

31. The most urgent need of this branch of the fish trade is, in our opinion, the study and adoption of new methods of curing. Preliminary investigation

will be required to determine what exactly are the problems at issue.

32. We have therefore recommended that a biochemist be detailed to prepare a preliminary report defining the scientific problems of economic importance attached to the preservation and curing of herrings. When those are stated a decision can be made whether further assistance can advantageously be given either at the central station or elsewhere.

33. The recent discoveries of the importance of vitamins in nutrition have drawn attention to the special value of cod-liver oil as a source of two of these vitamins, both for medicinal purposes and for strengthening other foods deficient in these substances.

34. Norwegian medicinal cod-liver oils are often inferior in vitamin content to those available from British and Newfoundland fisheries, but command a more ready sale in Great Britain owing to their freedom from taste and odour, qualities highly prized by the public.

35. We have therefore recommended investigation into the causes of variation in vitamin content in cod-liver oil and into the methods of refining cod-liver oil so that the full vitamin content of British Empire oils may be retained and the market objections in regard to taste and odour eliminated.

36. Much waste of material is associated at present with the fishing industry, and the fullest possible exploitation of the by-products of the industry is necessary for its economic development.

37. Wholesome white fish meal possesses special value as a feeding stuff for pigs, cows, poultry, and young stock. This property has only been recognised in recent years.

38. Certain trades in Great Britain, especially the bacon and pork trade, have strongly opposed the use of fish meal as a feeding stuff on the ground that a fishy "taint" in the flesh is thereby induced.

39. The instances of "taint" have almost certainly resulted from the immoderate use of inferior oily meal, which should be discouraged. According to repeated experiments at agricultural research stations, there is no risk attached to using white fish meal in the proportions and in the methods advocated by the English Ministry of Agriculture and Fisheries.

40. The new Fertiliser and Feeding Stuffs Act, 1926, imposes the maximum limits of oil and salt in white fish meal and empowers the English Ministry of Agriculture and Fisheries and the Scottish Board of Agriculture acting jointly to make further regulations with regard to this matter.

41. The opening for an extended use in the United Kingdom of fish meal by owners of stock is very great and its development should be beneficial both to the livestock industry and to the fishing industry.

42. In Australia, although the sparse population in the interior may render the distribution of fish difficult, yet the great coast cities should afford a market for efficient local fishing industries. In South Africa special attention is now being given to the possibilities of developing the fisheries and extending the market for fish.

43. In the Tropics the questions are somewhat different. Several governments have carried out exploratory work on fishing grounds in the vicinity of their coasts, but so far no fishing industry using power vessels has been established.

44. The question as to the most suitable form of vessel and gear for use in tropical fisheries has not yet been fully worked out, and experiments continuing over several years will be necessary. Fish is a very important article of food for the inhabitants of tropical regions, but problems of transport and preservation need to be solved. Fish meal and fish fertilizer should also be of special value in the tropics.

45. Much remains therefore to be done in regard to tropical fisheries. The experience of one administration should be of assistance to another. Several of the governments in the tropics maintain fishery departments, but whilst we hope their efforts will be continued, we desire to draw special attention to the favourable position, for this purpose, of the Malayan Governments. A fruitful fishing ground is readily accessible, and a large market exists for fish in Singapore and the Peninsula. These Governments have commenced experimental work on fishing problems, and we trust that in the direct interest of the people of Malaya, and in the ultimate interest of the people of all tropical parts of the Empire, these investigations may be systematically and continuously pursued until some definite light is thrown on the best means of developing tropical fisheries.

---

(*Continued from page* 180.)

on the part of organisms which otherwise would remain dormant.

It is, of course, far better to keep bacteria out of the milk altogether as far as possible, by attention to cleanliness of the apparatus and by the avoidance of contamination in every possible way. It is true that the raw milk, however carefully handled, will always contain a considerable number of bacteria, and preliminary heat treatment is essential. Since it is far easier to destroy bacteria in raw milk than in the concentrated product, it has been suggested by Savage that a preliminary heating to 100° C. for ten minutes (sterilisation) is to be preferred to a mere pasteurisation at this stage. From a bacteriological point of view, this is undisputably the right course. Whether it is justifiable on biological grounds is another matter, and one which cannot be considered here.

From the facts which have been set out in this article it will be seen that the spoilage of the two kinds of condensed milks is due to a variety of causes, and that the bacteriological problems encountered differ very much from those associated with the other classes of canned foods.

---

WE have received an interesting and useful booklet entitled "Convertit, as Used by the Modern Confectioner." It is issued by the Nulomoline Co., 111, Wall Street, New York.

---

THE Society of German Sugar Industries has initiated an advertising campaign for the increased use of sugar in the chocolate, jam, confectionery, and other industries.

# Food Factory Costing

CHARLES E. SEARLE.

PART I

*Generally speaking, accountants concern themselves only with figures, but the works-sales manager requires much more than this. He has, amongst other things, to consider the ever changing human element, and questions of difference in quality of goods purchased, either at different times or from different sources. To keep two sets of books for these purposes is obviously wasteful, and the object of these articles is to explain what may be called the collection of the ingredients of a costing system, with the necessary information for the departmental managers. Hence the costing office may combine the duties of costing with the collection of records and statistics, which though not directly matters of costing, are of immense value to the managers concerned. It must, however, be borne in mind that the costing office cannot live by itself in isolated seclusion, and for its work to be of value it must definitely link up with the general books, from the buying of raw material, labour, etc., to the final balance sheet.*

IN CONSIDERING the question of costing, a firm usually calls in an accountant for advice, and gets from him a report, which is usually more or less bewildering to the lay mind. It appears to call for an immense staff of clerks, stationery, calculating machines, typewriters, office furniture, and other equipment. It is often lost sight of that a costing office can only build up its work gradually, and with growing work comes greater efficiency and a more rapidly operating system. The first question that generally arises, is "Can we afford a costing system?" whereas the first question should be, "Can we afford the old rough and ready methods, and are we in such a prosperous condition that a difference of five to ten per cent., or more, either way, does not matter?"

In the old days, ingredients and labour were cheaper, but now when we cannot obtain prices for our goods at the advanced rate necessary to obtain the profits made by our fathers, a difference of one or a half per cent. may mean the difference between profit and loss, and failure or success.

The writer's experience has been chiefly with firms making a very large variety of goods. Of course, when a firm is simply making, say, custard powder, the costing will be considerably easier.

With a sound knowledge of the principles of costing, the introduction of a costing system into a newly started business is one of the least problems that the management would have to face; but when it is a question of introducing such a system into an old-established firm, it is quite a different matter.

Prejudice has to be faced and met. One is told that we got on alright in the past without these new-fangled ideas. Much of the necessary information is in the hands of foremen, who may be quite competent as manufacturers, but who generally have a very poor opinion of clerical work, and sometimes resent the conclusions arrived at by the costing department. It must, however, be admitted that these conclusions at the start are often incorrect, but as time goes on they become more and more accurate. For at least a year, the management must be content to give their whole-hearted support, with the confidence that reliable results will appear as things settle down.

## The Storeroom

It may be found that each manufacturing department has its own storeroom under the control of the foreman. Here lies the first difficulty. These storerooms must be closed, much to the annoyance of the foremen, or it will be found impossible to know what they are using or wasting, and even on occasion, what they are taking home.

A central store must be started, and round this room or rooms much of the work of the costing department, as far as factory costing is concerned, very largely concentrates. If possible, one at least of the costing clerks must be in constant touch with the storekeeper, who himself is better equipped if he has a clerical training.

All goods coming on to the firm go through the general store before going into manufacturing departments. In certain cases, however, of which the outstanding one is "meat" for the manufacture of meat pastes, tongues, etc., this is obviously impossible, and in such cases they only go through on paper. But until they are properly requisitioned by the department concerned, they must be considered the property of the storekeeper, and he must have access to them and make periodical examinations to see that they are quite in order. The storekeeper must also be in close touch with the goods inwards department, and nothing must come on to the firm without his knowledge.

At first we shall consider only the costing of departments, but later, if space permits, we will deal with individual manufactured articles.

For every article of every description requisitioned, whether it be a brush or a cask of vinegar, the foreman uses a form somewhat similar to the following:

From Dept. No. ..... Date..... No .....

Please supply goods as under: Article No.....

| B.C. | Goods Required. | Quantity. | Weight. | Rate. | £ | s. | d |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

*Foreman's Signature*..... *Received by*.....

The bincard number is filled in by the storekeeper. The foreman fills in the second and either the third or fourth column. The costing office attends to the rate of value. This form is usually in duplicate, the foreman keeping a copy, which is checked against the storekeeper's copy. The forms are numbered in rotation, and the costing department then debits the department with the value of goods used. This form is also used in conjunction with the stores ledger.

Here it may not be out of place to point out that, generally speaking, a foreman is a busy man, with a considerable number of problems of his own, many of which require immediate attention and prompt action. Consequently, everything that can be done to make his clerical work lighter should be done, particularly if he has no kitchen clerk. Generally speaking, an hour either way does not matter to the costing clerk, so that any points that have to be brought up should be at a time most suitable to the foreman, otherwise evasive replies will be given, which will lead to later complications. Printed forms of the kind mentioned above are very much better than scraps of paper. In one case, a costing clerk stated that he would soon know what every foreman was doing, and it is not surprising that the information he secured was rather unique. A costing clerk need as much tact as a works manager, and every works manager knows what that means.

## Bincards

The next step is to introduce bincards into the storeroom. In some cases these bincards are kept with the goods, so that an immediate check can be made at any time. But if kept there they are liable to get lost and dirty, so it is best to keep them in the storekeeper's office in properly arranged boxes. Bincards are not generally numbered in rotation, the dates being sufficient, and they are removed to the costing office as soon as they are filled in and finished with. It should be mentioned that every article has its corresponding number, known as the bin number; this number is entered on the bincard. The same number is entered on the new bincard when one card is filled up and a new one substituted.

Every article of stock and every article that goes into the stockroom on paper only must appear both inwards and outwards on these bincards, the cards being filled in immediately any goods arrive or leave the department. Thus, at any moment, it is possible to see not only the actual stock, but also exactly what quantities have arrived and have been used over a definite period. This information is of considerable value to the firm's buyer. A stiff card headed somewhat as follows is generally used:

BINCARD.

Bincard No. ..... Article.....

| *Inwards.* | | | | *Outwards.* | | | | |
|---|---|---|---|---|---|---|---|---|
| Date | Invoice No. | Quantity. | Received by. | Date | Requisition No. | Quantity. | Sig. | Present Stock. |
| | | | | | | | | |

Where goods appear on the inwards side, the line on the outwards is left blank and the total added to the present stock. The same happens for goods outwards; in this case the goods are deducted from the present stock column. Thus the stock in hand is always clearly shown.

It is a punishable offence for a stockkeeper to attempt to make his cards agree with his stock by adjusting his figures. The writer knows of one case where an otherwise satisfactory man was discharged, not for dishonesty, but for the above-mentioned reason. Any alteration or adjustment necessary should be made in red ink and signed by either the works manager or the chief costing clerk.

## Transfer Notes

By the time these matters are organised, possibly a month or more has gone by and a good start has been made. Our storeroom is a credit to the firm. It is kept clean and tidy, with clear passages for goods; it is a department in itself, which we are proud to show to visitors, and, more than that, we have begun the difficult task of educating our foremen. We then bring another little worry in front of them, and tell them that whenever they transfer any article from one department to another they must transfer it on a definite form. We do not attempt yet to instruct them in transferring goods from one use to another in their own department; this must come at a later date, by which time, if their confidence is secured, they will take a keen interest in the proceedings. Transfers are not used in connection with goods going from the stores, but only between departments. A transfer form is usually as follows:

TRANSFER NOTE. No. .....

Goods transferred from Dept. No..... to Dept. No.....

| Article. | Weight. | Quantity. | B.C. | Rate. | Value. |
|---|---|---|---|---|---|
| | | | | | |

*Received by*.....

This form is again in duplicate, a copy being kept by the foreman dispatching goods and a copy sent with the goods to the receiving department. It is also used in connection with the return of goods to the store from departments. Foremen, however, should be persuaded as far as possible only to order goods which they actually require from the store. A careless foreman will add immensely to the work of the costing office. The column B.C. is for the bincard number where goods are returned to store. In this case the entry is on the left-hand side of the bincard.

Transfer notes are usually collected every morning or evening from all departments by the junior in the costing office. A little consideration will show that it is to the advantage of the receiving foreman or storekeeper to lose these notes. Hence, the costing

# Report of the Government Chemist

DURING THE year 469,642 samples were examined at the Government Laboratory and at chemical stations, compared with 445,606 in the preceding year. There was a decrease of 3,594 samples examined at the Custom House branch, but the number examined at Clement's Inn showed an increase of 14,716, and at the chemical stations an increase of 12,914. The samples of wine increased from 106,395 to 122,749, and there was a decrease of 4,434 samples of tea compared with the previous year. There was an increase of 1,297 in the samples of exported tobacco and snuff, indicating that the increase in exports referred to last year has been maintained. The numbers of samples of cocoa goods and of imported and exported spirituous preparations increased, as did the number of samples examined in connection with the subsidy on British sugar. Owing to the new duties on silk and artificial silk, the examination of over 22,000 samples was necessary during the year, and the work in connection with the Safeguarding of Industries Act again involved the examination of nearly 10,000 samples. The contracts branch of the Admiralty submitted 47 samples of food on tender for report as to conformity with specification and opinion as to relative merits, and 203 samples were submitted by the technical examining officers at the victualling yards with the object of preventing the issue of canned foods contaminated with metals. Other samples numbered 86, and in addition the determination of the salinity of 1,325 samples of sea-water was carried out.

Of the 847 samples of butter examined during the year, three contained more than 16 per cent. of water. No samples of milk-blended butter were received; 65 of the samples received were from Scottish ports.

Four of the 341 samples of margarine contained more than 16 per cent. of water, but there was no evidence of butter fat in excess of the legal quantity in any of the samples, 53 of which were taken in Scotland and 8 in Northern Ireland.

The proportion of fat in cheese was found to vary from 9·1 to 45·0 per cent, or from 20·5 to 65·6 per cent. of the dry matter in the cheese. Some of the cheese had thus been made from skimmed milk, but no exception could be taken, as there are no appropriate regulations to control the marketing of skimmed milk cheese.

Twenty-five samples of preserved cream and 80 of unpreserved cream were examined, the unpreserved cream containing from 20 to 33 per cent. of fat, with the exception of two samples containing 50 per cent. of fat. The preserved cream contained 47 to 52 per cent. of fat. These samples were tested not only in relation to the Food and Drugs Acts Regulations, but to ascertain whether they conformed with the Milk and Cream Regulations, issued by the Ministry of Health under the Public Health Acts. Only one sample of tinned sterilised milk was examined. Of the 60 samples of condensed milk examined under the provisions of the Sale of Food and Drugs Acts, 8 of the samples, 3 of which were milk powder and 5 condensed milk, had been prepared from skimmed milk or partially-skimmed milk, but the packages from which the samples had been taken were not marked "Machine-Skimmed Milk," as required by the Act. Three samples imported as milk powder or block milk were found to have been derived from machine-skimmed milk, without anything in the marking to indicate that the fat had been removed before their preparation. In addition, 153 samples were taken under the Public Health (Condensed Milk) Regulations, which came into force on October 1, 1923, and 43 of these were reported against. In five cases the milk was below the minimum standard quality fixed by the Regulations, and in three cases the statement on the label of the quantity of whole milk which the contents of the tin represented was untrue, the amount being overstated. In other cases the offence was connected with the labelling. All the samples were free from chemical preservatives. Of the 21 samples of margarine taken at factories in this country, three contained water in excess of the legal limit. One sample of butter taken was found to contain vegetable oil.

*Chemistry and Industry.*

(*Continued from previous page.*)

department must be sure that no numbers are missing, and must check them with the transfer books in the various departments.

The transfer notes are then valued out, one department being credited and the other debited. Empty glass bottles and tins present some little difficulty, but the same procedure should be adopted. Breakages of glass in a department are a loss on the department, and a serious one that sometimes does not appear in rule-of-thumb methods.

We should like to point out how one serious difficulty may be overcome. Suppose a whole carcass is purchased, or, for that matter, one hundred carcasses, we think no costing system can tell the value of the individual joints, so the buyer, in co-operation with the works manager, works out a table for the use of the costing department, giving the values of the various parts when the whole carcasses are purchased at varying prices. This has to be carefully estimated, but the costing department see that the total of the values charged to the individual departments correspond with the total value of the original carcasses. This also has its bearing on finished products which we shall discuss later.

# Methods for Improving Bakery Practice

By Dr. H. LÜTHJE,
*Trocknungs-Anlagen-Gesellschaft, Berlin.*

SURELY OF all foodstuffs bread has the widest and greatest importance in the nourishment of mankind!

With advances in civilisation, the need for improvement in bread has grown proportionately. While our predecessors were satisfied with a product that was prepared in the most primitive manner from the milled flour, modern civilised people demand a better quality loaf, not only as regards the taste, but in other directions as well. Therefore, in the bakehouse they have to resort to various "improvers" in order to cope more or less adequately with the wishes of the bread-eating fraternity.

The pampered taste lays stress upon the idea that, at breakfast, the rolls shall lie on the table with a golden coloured and crisp crust. With the numerous existing varieties of flour, this is no easy problem for the baker. Production of such rolls is, nevertheless, comparatively easy if the baker uses a certain amount of malt extract in the dough. Through the diastase of the malt extract, the starch of the flour is partially changed into sugars before the dough goes into the oven. The stronger and more rapid saccharification acts in an extraordinarily favourable manner upon the working of the yeast, so that an even action takes place, thereby avoiding the large holes inside the bread or rolls. This saccharification has a further influence in that a much better and more beautiful crust is obtained during baking, because the colour of the crust in this case is obtained not only from the flour itself, but also from the caramelisation of the malt sugar and, through the working of the diastase, in more or less large quantities from the saccharified starch. As caramelised maltose has a far greater water absorption power than caramelised glucose, the crust will remain crisp longer; also maltose caramel keeps hard on absorbing moisture from the air, whereas glucose caramel soon becomes soft.

In the preparation of large loaves which, considering their weight, are relatively much cheaper than the small breakfast rolls, a corresponding quantity of malt extract would be very expensive. An experiment has therefore been tried to find bread improvers which will lead to a similar result. The idea has been formulated that the working of the dough and the formation of a good crust depend to a large extent upon the degree of saccharification in the dough, before it is placed in the oven. In such cases where the use of malt extract would be comparatively expensive, in order to secure the necessary saccharification, it has been found useful to add to the dough some hydrolysed starch. The first means used in this respect was the "potatosin," produced in Germany, which still at the present time is used to a large extent in the United States of North America, although under other names, as a bread improver. As raw material, potatoes, rich in starch, are used and thoroughly cleansed in specially designed washing machines, then steamed in an autoclave and dried on steam-heated cylinders. During the steaming and drying on the heated cylinders, a gelatinised potato starch is formed so that the finished product, besides one per cent. nitrogen, some cellulose and ash, consists chiefly of hydrolysed starch, which, when added to a dough of low, natural sugar content, enlivens the working of it. Besides the effect on the working of the dough and the feasibility of a good crust, the use of "potatosin" has also a further advantage, which is especially apparent in those districts where bread is only made at long intervals or must be supplied in comparatively large consignments. The gelatinised starch has the property of holding large quantities of water without becoming visibly damp. A loaf, therefore, which contains this kind of starch in any form will, in consequence, remain fresh longer than a loaf which was prepared only from wheat meal or rye meal. This phenomenon is especially apparent if the available baking flour is very glutenous, thus in the case where Durum wheat is obtained in quantity.

As, however, the potato flour or "potatosin" is not always procurable in the requisite white colour, and, on account of the great variety in species of potatoes, is not always obtainable in the same quality, the use of "risofarin" has been adopted recently instead of "potatosin" as a much more useful bread improver. The rice corn is notably very rich in starch and usually of fine white colour. Similarly, as in the case of the production of "potatosin," the rice is placed in autoclaves, hydrolysed up to a certain degree and then dried on steam-heated cylinders, and finally milled or ground. The drying apparatus in the course of time has become changed into a special apparatus, which permits the preparation of "risofarin" of a more uniform quality and at the same time automatically separates the particles of cellulose contained in the grain. As a result of this improvement in the "risofarin" machines, it is now possible instead of purified rice to use rough rice for the production of "risofarin."

As regards the quantity to be used of these bread improvers, the object of all of which is to improve the quality of the bread, it depends on the properties of the flour used and also on the provisions of the food laws of the various countries. In Germany an addition of only three per cent. is allowed. As the German varieties of grain, especially wheat, are comparatively poor in gluten, this amount is sufficient to attain the desired purpose. In the United States of North America five per cent. is allowed, and with the large amount of gluten in most kinds of grain with this percentage a loaf is produced of equal volume and comparatively greater stability.

It has clearly been shown that when "risofarin" came into use the white colour of the loaf, of which

*(Continued on next page.)*

# Canned Goods in China

By CHI LUNG SING.

CANNED GOODS are an important factor on the Peking market. Popular Chinese canned goods are meats and fruits, the former including beef, mutton, chicken and duck, and the latter peaches, pears, almonds, plums, apples, crab-apples, hill-haws, cherries, grapes, melons, pine-apples, lichees, loquats, and sweet oranges. Fish is less popular, though this is also canned by some companies. Among the meats, the most popular are beef manufactured by the Shanghai Food Co., in Tsinan, and mutton by the Ching Yeh Co., Peking, while among fruits, the first ten kinds mentioned above are exclusively the products of the Tientsin, Changli, and Peking companies. The last four kinds are products of the Swatow companies. The small amount of foreign canned goods is confined to biscuits.

At present, the Ching Yeh is the only factory in Peking, the Tien Yi Co. having ceased operations. The Ching Yeh Co. is operated by Chiang Yu-hung and others, with a capital of $100,000. Its office was originally located in Hsichihmen-tachieh, but has now been removed to Hsisze-pailou. It employs forty to fifty workmen. Its products number over sixty kinds, including meat, fruits, jam, biscuits, and candied fruit. They are consumed in Peking, Ningsia, Paotowchen, Sniynan, Pingtichuan, Fengchen, Tahing, Kalgan, Suanhwa, Taiyuan, Changan, Loyang, Kaifeng, Chengchow, Sinsiang, Hantan, Changte, Shunteh, Shihkiachwang, and Paoting. Recently, marketing has been extended to Lanchow, capital of Kansu province, the company having opened a branch office there. The cans used by this company are manufactured on the works with machines made in Japan.

The following are the Chinese companies whose products are popular in Peking:

| *Name of Company.* | *Location.* | *Kind of Goods Canned.* |
|---|---|---|
| Tung Ua Shih Wei Co. | Kinshan-chih-chieh | Fish and Fruits |
| Wu Wei Co., Swatow .. | Yunglungchieh | Fish and Fruits |
| Chen Mei Co., Swatow | Swatow | Fish and Fruits |
| Shanghai Food Co., Ltd., Tsinan .. .. | Tsinan | Meats |
| Sin Chung Canned Goods Co. .. .. | Changli, Chihli | Fruits |
| Peyang Industrial Three Star Co. .. .. | Tientsin | Fruits |
| Kwang Ta Co. .. .. | Tientsin | Meat, Fish and Fruits |
| Ching Yeh Canned Goods Co. .. .. | Peking | Meat and Fruits |

Apart from the Ching Yeh Co., which is in Peking, all the other companies have no branch offices in the capital. They send their own agents to Peking three or four times a year to secure orders from dry goods dealers. Sales are against monthly payment or payment at a fixed date mutually agreed upon. These agents make a short stay in the inns of native hotels at Hsihoyen, Tamochang, outside Chienmen, or at Tungsze-pailou.

The price per tin on June 1st was as follows: Beef, 35 cents; chicken or duck, 45 cents; lichee, 32 cents; loquat, 34 cents; sweet orange, 30 cents; other fruits, 25 cents. All "big money," or dollar cents.

# Peruvian Imports

ACCORDING TO a report of September 1, from American Consul George A. Makinson, Callao-Lima, Peru, there were five million dollars of United States foodstuffs imported into Peru in 1925.

Canned fruits are entered under Section 1,938 of the Peruvian Tariff, dutiable at 20 centavos (7½ cents United States currency) per kilo (2·2 pounds). Canned vegetables are entered under Section 1,922, dutiable at 15 centavos (slightly over five cents) per kilo, and surcharged, under the current emergency tariff 50 per cent. additional; total duty 8 cents United States currency per kilo. The market for the two classes of commodities, canned fruits and vegetables, is approximately $120,000 per annum, equally divided between the two, and of which the United States furnished in 1925 $34,000 in fruits and $27,000 in vegetables. This is a fairly steady market, but one which is not capable of any great expansion at the present time.

Imported foodstuffs are sold chiefly in the larger cities and in the mining centres. Lima, the import centre for this trade, receives 75 per cent. of the foodstuffs entering the country through the seaport of Callao, seven miles distant.

Great care should be exercised in the packing of merchandise destined for this country, as shipments are subjected to very rough handling on arrival when they are transferred from the ship's tackle to lighters, and then from lighter to shore. It is not advisable to pack canned goods at the rate of more than 24 to a case, unless the cans are 16 ounces or smaller. Labels may be in English or Spanish, and gross weight preferably in kilos should be shown on each box or case. It is advisable, although not required, that the name of the contents be shown in Spanish.

---

(*Continued from previous page.*)

the American is very insistent, was simultaneously considerably improved.

With advances in civilisation and refinement of taste, the standard of living of all classes of people has been raised, and from the point of view of bread consumption, the above-mentioned products are now indispensable for the continued improvement in the quality of bread.

# The Dairy Show

THE ABSENCE of live stock in the main hall was in one respect no loss to exhibitors, as it enabled the stands to be more easily seen by visitors. We noted the following stands as having a special interest for food manufacturers:

*Enamelled Metal Products* were showing their well-known Pfaudler glass-lined pasteuriser, holders, and equipment. Most makers of ice-cream, butter, or cheese made a point of inspecting these exhibits. The firm's principals and representatives greeted many old customers, and in not a few cases booked repeat orders.

*York Shipley, Ltd.*, had a very imposing and attractive stand, designed on the lines of the elevation of their fine model dairy, where all their refrigeration experiments are conducted. Refrigerating, ice-cream, and milk cooling plant were shown.

*Wallis Crown Cork Co., Ltd.*, had a very complete exhibit of capping equipment, including their well-known Wallis Patent Safety Cap. Although the luck of the draw had not placed them in the most prominent position, few visitors missed their stand, and they were, we understand, more than satisfied with the business done. The Wallis Cap was used exclusively in the model dairy at the show.

*William Douglas and Sons, Ltd.*—Among other plant exhibited was a very interesting non-frothing milk pump.

*J. and E. Hall, Ltd.*, showed a machine actually cooling a chamber suitable for the dairy trade, and the visitor could not fail to be impressed by the compactness and efficiency of the plant.

*Mono Service Containers, Ltd.*, had a very attractive display.

*United Glass Bottle Manufacturers, Ltd.*, report that in the day previous to our visit they had booked repeat orders totalling over four thousand gross U.G.B. bottles were used in the model dairy.

*R. and A. Lister and Co., Ltd.*, demonstrated their cream separators and many of their latest designs of dairy utensils. Lister engines for small plants are well-known, and various sizes of these were also shown.

*W. and C. Pantin.*—A working exhibit always attracts attention. On Pantin's stand an inclined dray-type elevator for raising cases was working. This included a device for taking the packages down an incline without breakages. Many inquiries were received.

*South Metropolitan Gas Co.* had their usual attractive stand, and were showing their disinfectants and wood preservatives.

*Aluminium Plant and Vessel Co., Ltd.*, showed a complete pasteurising plant. It is interesting to learn that this firm are now manufacturing an all-British design, which probably for the first time is being exported to many parts of the world.

# U.K. Dried Milk Regulations

THE PROPOSED Draft Order regarding dried milk provides that the regulations shall come into force July 1, 1928. The alterations are:

The following paragraphs shall be substituted for sub-division (1) of paragraph 1 and paragraph 2 of the First Schedule to the principal Regulations:

1. Every tin or other receptacle containing dried milk (other than dried milk to which sugar or some other substance has been added) shall bear a label upon which is printed such one of the following declarations as may be applicable or such other declaration substantially to the like effect as may be allowed by the Minister.

In the case of full cream, that is to say, dried milk containing not less than 26 per cent. of milk fat, the label must declare that the contents are the equivalent of so many pints of milk. In the case of partly skimmed milk, that is to say, dried milk containing not less than 8 per cent. but less than 26 per cent. of milk fat, the label must intimate that the contents should not be used for babies, except under medical advice. In the case of skimmed milk, that is to say, dried milk containing less than 8 per cent. of milk fat, the tin must be labelled "unfit for babies."

2. (*a*) The prescribed declaration shall be printed in dark block type upon a light coloured ground.

(*b*) There shall be a surrounding line enclosing the declaration, and in the case in which the words "unfit for babies" are required to be used there shall be another such line enclosing those words.

(*c*) The distance between any part of the words "unfit for babies" and the surrounding line enclosing those words shall be not less than one-sixteenth of an inch.

(*d*) No matter other than that hereinbefore prescribed shall be printed within either surrounding line.

(*e*) The type used for the declaration shall not in any part be less than one-eighth of an inch in height (or if the gross weight of the tin or other receptacle does not exceed twelve ounces, one-sixteenth of an inch in height) and the type used for the words "unfit for babies" shall not be less than twice the height of any other part of the declaration.

4. No person shall expose or offer for sale for human consumption any dried skimmed milk in a tin or other receptacle enclosed in a paper or other wrapper unless the words "unfit for babies" are printed on the outside of such wrapper within a surrounding line, the type used for the words being not less than a quarter of an inch in height and the printing being otherwise in accordance with the rules prescribed for the printing of the same matter on the label affixed to the tin or other receptacle.

5. Copies of the Public Health (Dried) Milk Regulations, 1923, printed under the authority of His Majesty's Stationery Office, may be printed with any additions, omissions, or substitutions directed to be made by these or any other amending Regulations, but with a footnote in each instance referring to such amending Regulations; and the principal Regulations so printed may be cited as the Public Health (Dried) Milk Regulations.

# Moisture in Bread

THE *British Food Journal* recently published an interesting communication from Dr. James Oliver relating to the moisture content of bread.

Dr. Oliver observes that it is generally understood that the word "bread," as used in this country without any qualification, means white bread—bread made from fine, wheat flour. It is sold by weight, consequently its water content, so far as its nutritive value is concerned, is a matter of some importance. Made without the pernicious aid of so-called "chemical improvers," the water content of good, wholesome bread should not exceed 40 per cent. Quite apart from any chemical improvers, if bread contains more than the aforesaid amount of water it must be looked on as adulterated. This, of course, means that to be fair to the baker the water content of flour should be determined and fixed by our Minister of Health and sanctioned by our legislators. As flour is hygroscopic, this is not a difficult procedure. On striking an average, as has been done in the case of milk, the water content of flour should not exceed 15 per cent. Not infrequently, however, in this and other countries it happens that flour, like milk, is adulterated with water, an innocent enough adulterant, no doubt, but the consumer neither in the case of flour nor in that of bread should be obliged to pay flour price for added water, but should be protected against such fraudulent practices by legislation. From an economic and dietary point of view, bread is undoubtedly entitled to rank as a staple food in this country. If made from whole wheat meal it is a complete ration. By this we mean it contains all the materials necessary for nourishing our bodies. On this account it has been proved to be, and every endeavour should be made to keep it, the cheapest of all nutrients. Without, however, a standard of purity, one asks in all seriousness who shall determine what whole wheat meal bread should be. Clearly, it should not be bread made of a mixture of bran and white flour, although bread made of such a mixture may resemble closely whole wheat meal bread. This really is one of the great difficulties one encounters in recommending from a medical point of view whole wheat meal bread, and is a potent reason for the people urging our Minister of Health to furnish us with definitions and set up standards of purity for whole wheat meal as well as for fine white flour. One of the great difficulties connected with the manufacture and sale of whole wheat meal is its tendency to become rancid if kept too long. Because of this, the whole wheat meal used for making whole wheat meal bread would have to be ground in this country. From a commercial point of view, however, this would be a decided boon.

# Correspondence

## BABY FOODS

*To the Editor*, FOOD MANUFACTURE,

SIR,

In the number of FOOD MANUFACTURE for August, 1927, a paper is published on "Baby Foods."

I am fully in accord with the author's statement in the heading that the analytical data of such foods should be given in a much more detailed manner than is usual, and I would go further and say that such words as carbohydrate and protein should not be used in an inclusive manner, but the actual substances present should be declared.

As we have no real guide to the true composition of a baby food, except that of the natural food, it is most important that the users of prepared foods should know whether substances which do not normally occur in human milk are present or not.

I note, however, that in the paragraph on "Humanised Milk" the author states that deficiency of lactalbumen is usually overlooked. This is quite true, but there is no need for it to be overlooked, and it is most important in a true baby food that the lactalbumen should be present in the same relative proportion to caseinogen as is the case in the natural product. Only in this way are the valuable mutual colloidal effects of the two proteins maintained, and when this is done, there is no need for any addition of the usual foreign starchy materials nor for any alteration of the caseinogen by heating or otherwise. It is probably true that lactalbumen is more useful to the infant than caseinogen.

I think, however, exception should be taken to the statement under "Dried Milk Preparations," that,

> "Even the best of desiccated milks suffer from a serious defect since the present methods used in desiccation destroy most of the vitamines of the original milk."

This statement is very wide of the mark, as it has been conclusively shown that the methods employed in the manufacture of the best desiccated milks do not have any noticeable effect on any of the vitamines, with the exception of vitamine C. There is no reason to believe that a dried humanised milk made solely from true milk constituents and dried in a proper manner is in any way defective from the point of view of vitamines with the sole exception noted above.

I quite agree with the author's statement in his conclusions that

> "There is no evidence that any patent baby food is any better than cow's milk that has been properly modified";

but the fact remains that there is a preparation on the market which is made from cow's milk *properly* modified, and therefore it is hardly fair to give the impression that there are no patent foods which are not satisfactory in this direction.

Yours truly,

CECIL REVIS, F.I.C.

# Commercial and Legal News

*(The Editor does not accept responsibility for any errors which may occur in the following notices.)*

## New Companies

*The undermentioned particulars of New Companies recently registered are taken from the Daily Register compiled by Jordan and Sons, Ltd., Company Registration Agents, 116-118, Chancery Lane, London, W.C.2*

WEST OF ENGLAND BACON CURING COMPANY, LIMITED. (223777) Regd. August 12, 1927. Ruardean, Gloucestershire. To acquire properties in the county of Gloucester or elsewhere, and to carry on bus. as indicated by the title. Nom. Cap.: £1,000 in 5/- shs. Minimum subsn., 7 shares.

Dirs.: To be appointed by the subs.

Qual. of dirs. (except 1st dirs. and those appointed by them): 100 shs. Remun. of dirs., £50 each per annum (chairman £75).

Subs.: A. S. Kearton, 6, Serjeants Inn, E.C. (solr.).
J. E. Bracher, 62, Oakhill Road, Putney, S.W.15 (clerk), and 5 other clerks.

SALINAX COMPANY, LIMITED. (223771) Regd. August 12, 1927. To carry on the bus. of mnfrs. of and dlrs. in feeding stuffs and mineral salts, etc. Nom. Cap.: £2,100 in £1 shs. (2,000 preference and 100 ord.).

Dirs.: Not named.

Qual. of dirs.: None required.

Subs.: A. T. C. Baker, 15, Stonehill Road, Gunnersbury, W.4. (solr.'s mang. clerk).
W. G. A. Payne, 106, Kingsley Road, Hounslow, Mdx. (solr.'s clerk).

NUTRIS, LIMITED. (223787) Registered August 13, 1927. 4, London Wall Avenue, London Wall, E.C.2. To carry on the bus. of manufacturing confectioners, dealers in spices, etc. Nom. Cap.: £500 in £1 shs. (498 pref. and 2 ord.).

Permt. dirs.: W. A. Lewis, 11-12, Finsbury Sq., E.C.
S. Greenfield, 19, Mornington Road, Bow, E.

GREENFIELDS CONFECTIONS, LIMITED. (223796) Regd. August 13, 1927. 1a, Forest Lane, Maryland Point, Stratford, E.1. To carry on the bus. of manufacturing confectioners, etc. Nom. Cap.: £100 in 10/- shares.

Permt. dirs.: W. A. Lewis, 11-12, Finsbury Sq., E.C.
S. Greenfield, 19, Mornington Road, Bow, E.3.

SIR THOMAS ROBINSON AND SON (GRIMSBY), LIMITED. (224338) Regd. September 10, 1927. Wharncliffe Road, Fish Docks, Grimsby. To carry on the bus. of steam trawling, and all methods of fishing, etc. Nom. Cap.: £45,000 in £1 shares.

Dirs.: F. W. Robinson, Summerfields, Kingsway, Cleethorpes.
F. Hazelgrove, "Rydalhurst," Queens Parade, Cleethorpes.
H. Adams, "Southlands," Kingsway, Cleethorpes.

S. R. ALLEN AND SONS, LIMITED. (224321) Regd September 9, 1927. Post Office Chambers, Congleton Ches. To take over the bus. of a mineral water mnfr cd. on at Lawton Street, Congleton, by S. R. Allen Nom. Cap.: £3,000 in £1 shares.

Dirs.: S. R. Allen, 53, Lawton St., Congleton (mang. dir. and ch.).
J. S. Allen, Station Road, Mossley, Congleton.
H. Allen, 4, Albert Street, Congleton.
P. Allen, 38, Spragg Street, Congleton.
W. R. Allen, 72, Lawton Street, Congleton

HERBERT TAYLOR (BLACKPOOL), LIMITED. (224555) Regd. September 21, 1927. To carry on bus. as mnfrs of and dlrs. in biscuits, confectionery, etc. Nom Cap.: £2,000 in £1 shs. (1,000 pref. and 1,000 ord.).

Life dirs.: H. Taylor, "Lippincott," Victoria Road, Cleveleys (mang. dir.).
J. Warburton, 602, Lytham Road, Blackpool.

Qual. of mang. dir., 500 ord. shares; of dirs., £200 shares. Remun. of mang. dir., as fixed by the board

REDHEAD AND COMPANY, LIMITED. (224674) Regd September 26, 1927. Star Confectionery Works, Morpeth Road, Blyth. To take over the bus. of mnfrs of and dlrs. in confectionery as cd. on at Blyth, Northumberland, as "Redhead and Co." Nom. Cap.: £15,000 in £1 shares (7,500 pref. and 7,500 ord.).

Dirs.: H. Musgrave, "Tyneholme," 20, Howard Place, Carlisle.
W. E. Guest, South Hiendley, nr. Barnsley.
G. A. B. Musgrave, Chapelthorpe, nr. Wakefield.

Qual. of dirs., £500 shs. or stock. Remun. of dirs., as voted by the co.

LEICESTERSHIRE GRADED MILK, LIMITED. (224723) Regd. September 28, 1927. 46, London Wall, E.C.2. To carry on the bus. indicated by the title. Nom. Cap.: £1,000 in £1 shares.

Permt. dir.: J. H. St. George, address not stated. Remun. of dirs., as voted by the company.

Subs.: W. G. Watson, 112, West End Road, Norwich (clerk).
P. C. Sutton, 51, Ewhurst Road, Crofton Park, S.E.4 (clerk).

E. AND T. PINK, LIMITED. (224751) Regd. September 29, 1927. Minto Street, Bermondsey, S.E.1. To carry on the bus. of mnfrs. of and dlrs. in custard and baking powders, egg substitutes, etc. Nom. Cap.: £50 in £1 shares.

Dirs.: T. D. Cocke, Moyns House, Marryat Road, Wimbledon, S. W.
F. H. Plaistowe, 17, Stanhope Road, Highgate, N.
M. R. Pitter, 15, Carlton Road, Putney, S.W.
P. Zeylmans, Queens Hotel, Upper Norwood, S.E.

Qual. of dirs., one share. Remun. of dirs., as voted by the co.

ALLIED FRUIT COMPANY, LIMITED. (224811) Regd. October 1, 1927. Aldwych House, Aldwych, W.C.2. To enter into agreement with A. D. Hamilton, Goodwin Simons, Ltd., Simons and Co., Ltd., and J. and H. Goodwin, Ltd., and to carry on the bus. indicated by the title. Nom. Cap.: £20,000 in £1 shares.

Dirs: E. I. Simons, 11, Montgomerie Drive, Glasgow.
H. Goodwin, Ivyholme, Macclesfield, Ches.
H. T. Mackie, 12, Rundell Crescent, Hendon, N.W.
J. L. Gibson, 34, Knowsley Road, Cressington Park, Liverpool.
R. S. Jacobs, "Wychbury," Winchester, Hants.
M. G. Simons, 13, Montgomerie Drive, Glasgow.
A. D. Hamilton, Colon 74, Valencia, Spain.

Remun. of dirs., as voted by the company.

COPES CONFECTIONS, LIMITED. (224815) Regd. October 1, 1927. 10, Finsbury Square, E.C.2. To carry on the bus. of mnfrs. of and dlrs. in sweetmeats, etc. Nom. Cap.: £100 in 10 pref. shares of £5 and 1,000 ord. shares of 1/-.

Dirs.: Not named.

Qual. of dirs., 2½ per cent. of the share cap. up to an authorised cap. of £10,000. Remun. of dirs., a sum equivalent to 2½ per cent. on the cap. of the co. up to an authorised cap. of £10,000.

Subs.: R. J. Coen, 32, Derby Avenue, North Finchley, N.12 (law clerk).
W. J. Fraser, 2, Finsbury Square, E.C.2.

E. V. SIMPSON, LIMITED. (224816) Registered October 1, 1927. 605, Smithdown Road, Liverpool. To carry on the bus. of mnfg. confectioners, bakers, etc. Nom. Cap.: £1,000 in £1 shares.

Permt. dirs.: Emily V. Allan, 82, Grant Avenue, Wavertree, Liverpool.
F. V. Simpson, 29, Fallowfield Road, Wavertree.
R. S. Simpson, 1, Sandyville Road, Liverpool.
W. C. Simpson, 605, Smithdown Road, Liverpool.
Lillian W. Simpson, 605, do.

BARRETT'S COUNTRY BOTTLING COMPANY, LIMITED. (224911) Regd. October 6, 1927. 240, St. Vincent Street, Birmingham. To carry on the bus. indicated by the title. Nom. Cap.: £5,000 in £1 shares.

Dirs.: E. Langman, 98, Park Road, Sparkhill, Birmingham.
H. J. Pritchett, White Lodge, Tenbury Road, King's Heath, Birmingham.

Qual. of dirs., 50 shares.

G. E. FIELDER (CATERERS), LIMITED. (224887) Regd. October 5, 1927. 34-36, Gresham Street, E.C.2. To carry on the bus. of bakers and confectioners, etc. Nom. Cap.: £500 in £1 shares.

Dirs.: To be appointed by the subs.

Qual. of dirs., £50 shares. Remun. of dirs., £5 each per annum (chairman £10).

Subs.: C. S. Steel, 34-36, Gresham Street, E.C.2 (chtd. acct.).
H. C. Bunn, 34, do. (incorpd. acct.).

WARWICKSHIRE CREAMERIES, LIMITED. (224862) Regd. October 3, 1927. To take over the businesses of retailers of milk and dairy produce cd. on at 7, Swan Street, by A. H. Yates, at 28, West Street, by P. W. Croome, and at 49, Cherry Street, all in Warwick, by W. H. Vanstone. Nom. Cap.: £6,000 in £1 shares.

Dirs.: M. T. Harrison, Old Park, Warwick.
P. W. Croome, 28, West Street, Warwick.
S. C. Cockburn, Budbrooke Lodge, Warwick.
E. D. Shepherd, 10, High Street, Warwick.
A. H. Yates, 7, Swan Street, Warwick.

Qual. of dirs., £100 shares. Remun. of dirs., £10 each per annum.

DUNCAN (CEREALS), LIMITED. (224933) Regd. October 7, 1927. 27, Mincing Lane, E.C.3. To take over the bus. now cd. on at Mincing Lane as "A. E. Duncan and Son," and to carry on the bus. of genl. import and export mchts., etc. Nom. Cap.: £5,000 in £1 shares.

Dirs.: W. D. Redmond, 28, Alexandra Road, N.W.8.
P. G. Davidson, 5, Tryon House, Mallord Street, Chelsea, S.W.3.

Qual. of dirs., one share.

SUGAR TRUST, LIMITED. (225049) Regd. October 12, 1927. 66, Coleman Street, E.C.2. To acquire and deal in shares, stocks, and other securities; and any real or personal property; to build factories and works, etc. Nom. Cap.: £12,000 in 1/- shares. Minimum subsn.: 7 shares.

Dirs.: To be appointed by the subs.

Subs.: F. C. Howard, 52, Mount Park Road, Ealing, W.5 (solr.).
D. C. Tewson, 21, Compton Road, Winchmore Hill, N.21 (solr.).
S. H. Thomas, 51, Pelham Road, Gravesend (solr.).
H. H. Walton, 275, Croxted Road, West Dulwich, S.E.21 (clerk), and three others.

VICTORIA BISCUITS, LIMITED. (225073) Regd. October 13, 1927. 5, Laurence Pountney Hill, E.C. To carry on the bus. indicated by the title. Nom. Cap.: £1,000 in £1 shares.

Dir.: H. H. Hyrons, "Edacre," St. James' Gardens, Westcliff-on-Sea.

Qual. of dirs., one share. Remun. of dirs., as voted by the co.

GENERAL CONFECTIONERY TRUST, LIMITED. (225153) Regd. October 17, 1927. To carry on the bus. of confectioners, etc. Nom. Cap.: £1,000 in £1 shares.

Dirs.: H. C. Vickers, 5, Copthall Court, E.C.
J. S. Churchill, 5, do.

Qual. of dirs., 100 shares.

CONFECTIONS, LIMITED. (225165) Regd. October 18, 1927. 110, Millbrook Road, Southampton. To carry on the businesses of chocolate and confectionery mnfrs. and agents cd. on at Southampton and 164, Charminster Road, Bournemouth. Nom. Cap.: £2,000 in £1 shares.

Dirs.: M. L. Hill, 164, Charminster Road, Bournemouth.
D. Smale, 164. do.
Qual. of dirs., £25. Remun. of dirs., as voted by the company.

ROCKET CONFECTIONERY WORKS, LIMITED. (225200) Regd. October 19, 1927. To take over the bus. of a mnfg. confectioner cd. on at Forth Station Bldgs., Pottery Lane, Newcastle-upon-Tyne, as the "Rocket Confectionery Works," with the regd. trade mark "Rocket," etc. Nom. Cap.: £12,000 in £1 shares.
Mang. dir.: W. E. Hunt, 46, Queens Road, Jesmond, Newcastle-upon-Tyne.
Qual. of dirs., £100. Remun. of dirs., as voted by the co.
Sub.: G. Taylor, Cranleigh, Osborne Gdns., Monkseaton (acct.).

PURNELL & CO., LIMITED. (224155) Regd. September 1, 1927. 15a, Bury Street, Guildford, Surrey. To carry on the bus. of mnfrs. of and dlrs. in mineral and aerated waters, British wines, etc. Nom. Cap.: £9,000 in £1 shares.
Dirs.: J. W. Taylor, Sunnyridge, White Lane, Guildford (permt.).
E. Purnell, 8, Dapdune Crescent, Guildford.
Qual. of dirs.: £250 shares.

VITAMOGEN TONIC FOOD, LIMITED. (224233) Regd. September 5, 1927. To acquire the trade mark "Vitamogen," and the assets (except book debts) of Vitamogen, Limited; to mnfr. and sell the Vitamogen food preparation, etc. Nom. Cap.: £1,000 in £1 shares.
Dirs.: Not named.
Subs.: F. W. Moore, 17, Throgmorton Avenue, E.C. 2, C.A.
H. R. White, 11, Palace Road, Streatham Hill, S.W.2.

## London Gazette Information

*Merchandise Marks Act*, 1926.

*Imported Oats.*

It is announced that an application for an Order in Council under the above-mentioned Act, to require the marking of imported oats, has been referred for inquiry to the Standing Committee set up under the Act by the Minister of Agriculture and Fisheries, the Secretary of State for the Home Department, and the Secretary of State for Scotland, acting jointly.

It is expected that the inquiry in this case will take place in conjunction with that relating to imported oatmeal and rolled oats. The date of the inquiry will be announced later.

Attention is called to the fact that, under the provisions of the Act, while the Committee in every case referred to them must consider whether the goods should bear the indication of origin at the time of sale or exposure for sale, they may also, at their discretion, consider and report upon the question whether such goods should bear an indication of origin at the time of importation.

Any communication with regard to the matter should be addressed to Mr. H. J. Johns, Secretary of the Standing Committee, 10, Whitehall Place, London, S.W.1.

*Marking of Imported Honey.*

The Public Inquiry into the application for an Order in Council under the Merchandise Marks Act 1926, to require the marking of imported honey will be held in Room 104, at 10, Whitehall Place, London S.W.1, commencing at 10.30 a.m., on Wednesday October 26, 1927, and continuing, if necessary, at the same time on Friday, October 28, 1927.

Applications to be heard in evidence and any other communications with regard to the matter should be addressed, as early as possible, to the Secretary of the Standing Committee, Mr. H. J. Johns, 10, Whitehall Place, London, S.W.1.

*Joint Stock Companies.*

The names of the undermentioned companies were struck off the Register on October 11, and such companies are dissolved:

Home Brewery (Quarry Bank), Ltd. Ripponden Free Brewery Co., Ltd.

*Voluntary Liquidations.*

Note.—Voluntary liquidations may, in some instances, refer to companies in course of reconstruction.)

RINGWOOD CIDER CO., LTD. Resolved, September 23, that the company be wound up voluntarily, and that Mr. S. G. Best, of Avon Chambers, Salisbury, be appointed liquidator.

K. A. PRESERVES, LTD. Resolved, September 30, that the company be wound up voluntarily, and that Mr. E. T. Granger, C.A. (of Messrs. Peat, Marwick, Mitchell and Co., London and Cardiff), be appointed liquidator.

*Meetings to Hear Liquidator's Reports.*

SYNTHETIC MILK SYNDICATE, LTD. (in voluntary liquidation). General Meeting of members of this company at 31, King William Street, E.C., on November 21 at 3 p.m. Liquidator: J. G. Godwin.

WOODHAMS AND CO., LTD. (in voluntary liquidation). General Meeting of members of this company will be held at the Medway Brewery, Maidstone, on November 22 at 11.15 a.m. Liquidator: A. J. Dyson.

THE FOUR MARKS FOOD CO., LTD. (in voluntary liquidation). General Meeting of members of this company will be held at Southgate Chambers (Messrs. C. Johnson and Son, Incorporated Accountants), Winchester, on October 28 at 11 a.m. Liquidator: A. J. Johnson, F.S.A.A.

**FOOD MANUFACTURE is sent to any address in the World for 10s. per annum. Send your subscription now to LEONARD HILL, LTD., 173, Fleet Street, London, E.C. 4.**

# Current Literature

## Fruit and Vegetable Products

Effect of Ethylene on the Composition and Colour of Fruits. E. M. Chance and C. G. Church. (*Ind. Eng. Chem.*, October, 1927, 1135.)

Commercial Applications of Chlorophyll Derivatives. F. M. Schertz. (*Ind. Eng. Chem.*, October, 1927, 1152.)

Simplified Pea Labels. J. P. Street. (*Canning Age*, October, 1927, 809.)

Storage Buildings in Field Warehousing. L. V. Burton. (*Canning Age*, October, 1927, 817.)

Cold Packing Red Sour Cherries. C. P. Lathrop. (*Canning Age*, October, 1927, 837.)

Recovery of Pectin from Waste Orange Peel and Pulp. M. Parrazani. (*Industrie Chimique*, 1927, 14, 117.)

Physiology of Apples. VI. Correlation in the Individual Apple between the Mineral Constituents and other Properties. J. W. Brown. (*Ann. Bot.*, 1927, 41, 127.)

Pectins of Grapes and the Mellowness of Wines. L. Semichon. (*Chem. et Ind.*, 1927, 17, 25.)

Effect of Small Amounts of Chemicals in Increasing the Life Activities of Plants [and Ripening of Fruit]. F. E. Denny. (*Proc. Nat. Acad. Sci.*, 1927, 13, 555.)

## Cereal Products

The Chemical Treatment of Flour. E. Lehmann. (*Deut. Nahrungs. Rundsch.*, 1927, 20, 155.)

Wheat and Flour Studies XI. Extraction of Proteins from Wheat Flour. P. F. Sharp and B. L. Herrington. (*Cereal Chem.*, 1927, 4, 249.)

Relation of Hydrogen-Ion Concentration of Dough to Baking Properties. E. Grewe and C. H. Bailey. (*Cereal Chem.*, 1927, 4, 261.)

Factors Affecting Interpretation of Experimental Baking Tests. M. J. Blish and R. M. Sandstedt. (*Cereal Chem.*, 1927, 4, 291.)

Value of Experimental Milling Test. R. S. Herman. (*Cereal Chem.*, 1927, 4, 270.)

Washing of Gluten from Flour. D. W. Kent-Jones and C. W. Herd. (*Analyst*, 1927, 52, 439.)

Chemical Modifications Produced in Wheat Flour by Benzoyl Peroxide. S. Baglioni and L. Settimj. (*Annali Chim. Appl.*, 1927, 17, 351.)

## Confectionery

Milk—and Cream—Caramels. Dr. Rossée and Dr. V. Morgenstein. (*Deut. Nahrungs. Rundsch.*, 1927, No. 20, 156.)

Emulsions Best Form for Flavours. W. Wesley. (*Confectioners Jour.*, May, 1927, 82.)

Ten Thousand Years of Sweets. P. Reed. (*Confectioners Jour.*, May, 1927, 89.)

Why use a Thermometer? W. Wesley. (*Confectioners Jour.*, June, 1927, 78.)

Humidity Control. W. Wesley. (*Confectioners Jour.*, August, 1927, 72.)

How to Grade Marshmallows. W. W. Duecker. (*Confectioners Jour.*, August, 1927, 82.)

Care of Starch is Important. W. Wesley. (*Confectioners Jour.*, September, 1927, 76.)

Scientific Drying Saves Money. W. Wesley. (*Confectioners Jour.*, October, 1927, 67.)

## Various

Theory of Fat Separation in Emulsions. G. Grindrod. (*Canning Age*, October, 1927, 822.)

Effect of Benzoic and Cinnamic Acids on the Rate of Development of Rancidity in Lard. W. J. Husa and L. M. Husa. (*Jour. Amer. Pharm. Assoc.*, 1926, 15, 1071.)

Effect of Common Salt on Lime Water used for Egg Preserving. J. Miller. (*Analyst*, 1927, 52, 457.)

Ammonia Content of Cold-Storage Eggs. H. C. Lythzoe. (*Ind. Eng. Chem.*, 1927, 19, 922.)

Action of Ethylene on Pure Starch. H. E. Rea and R. D. Mullinix. (*Jour. Amer. Chem. Soc.*, 1927, 49, 2116.)

Cod Liver Oil as Food. Observations on the Existence of Vitamin. E. V. E. Nelson, R. L. Jones, G. Adams, and L. T. Anderegg. (*Ind. Eng. Chem.*, 1927, 19, 840.)

Solidified Carbon Dioxide as a Substitute for Ice. (*Cold-Storage*, October, 1927, 315.)

Factory needs Clean, Dry Air. A. G. Luders. (*Confectioners Jour.*, May, 1927, 75.)

"Mikrobin" [sodium p-chlyorobenzoate] as Food Preservative. C. von der Heide and R. Föllen. (*Zeit. Unters. Lebensm.*, 1927, 53, 487.)

## Analysis

Indentification of Honeys. M. Mansfield. (*Oesterr. Chem. Zgt.*, 1927, 30, 81.)

Volumetric Titration of Commercial Vanillin. V. Zarotti. (*Boll. Chem. Farm.*, 1927, 66, 33.)

Detection of Hardened Whale Oil in Lard. A. Gronover and A. Blechschmidt. (*Zeit. Unters. Lebensm.*, 1927, 53, 250.)

Determination of Gelatin in Ice-Cream. R. E. Remington and L. H. McRoberts. (*Ind. Eng. Chem.*, 1927, 19, 267.)

Micro-Determination of Caffeine in Coffee. A C. Röttinger. (*Zeit. Unters. Lebensm.*, 1927, 53, 146.)

Detection and Determination of Nitrogen-bearing Chemicals added to Animal or Vegetable Nitrogenous Materials. H. C. Moore and R. White. (*Ind. Eng. Chem.*, 1927, 19, 264.)

Natural Occurrence of Boron Compounds in Cacao and Cacao Products. S. Dodd. (*Analyst*, 1927, 52, 459.)

Direct Determination of Sodium Chloride in Foodstuffs. F. Mach and W. Lepper. (*Landw. Versuchs-Stat.*, 1927, 105, 333.)

Interpretation of Bromatological Analyses. A. Beythen, C. Hartwich, and M. Klimmer. (*Anal. Oficina Quin. Prov. Buenos Aires*, 1927, 1, 91.)

A New Method for the Determination of Benzoic Acid in Foods. G. W. Monier-Williams. (*Analyst*, October, 1927, 572.)

The Detection of the Prohibited Vegetable and Coal Tar Colours in Foodstuffs. G. R. Nicholls. (*Analyst*, October, 1927, 585.)

Analysis of Fruit and Apple Jams. C. F. Muttelet. (*Ann. Falsif.*, 1927, 20, 391.)

Bulgarian Honey and Bees'-Wax. J. Zoneff. (*Zeit. Unters. Lebensm.*, 1927, 53, 353.)

Analysis of Honey. F. Lucius. (*Zeit. Unters. Lebensm.*, 1927, 53, 376.)

Method for the Detection of Fruit Wine in Grape Wine. K. Müller, E. Vogt, and O. Raesch. (*Zeit. Unters. Lebensm.*, 1927, 53, 331.)

Detection of Fruit Wine in Grape Wine. M. Rüdiger and W. Diemair. (*Zeit. Unters. Lebensm.*, 1927, 53, 335.)

Determination of the Freshness of Milk. G. Inichoff. (*Zeit. Unters. Lebensm.*, 1927, 53, 435.)

Determination of Chloride in Milk. F. Mach and W. Lepper. (*Zeit. Unters. Lebensm.*, 1927, 53, 454.)

Significance of Solids-not-fat for the Detection of Watered Milk. A. Gronover and F. Türk. (*Zeit. Unters. Lebensm.*, 1927, 53, 520.)

Simplified Chlorine Determination in Milk. G. Schulze. (*Zeit. Unters. Lebensm.* 1927, 56, 157.)

Securing True Average Samples of Milk. K. Weber. (*Zeit. Unters. Lebensm.*, 1927, 53, 449.)

Methylene Blue (reductase test) in Milk Grading. M. Grimes, H. S. B. Barrett, and J. Reilly. (*Sci. Proc. Roy. Dublin Soc.*, 1927, 18, 437.)

Testing the Refractive Index and Lactose Contents of Milk from Individual Herds. G. Schulze. (*Zeit. Unters. Lebensm.*, 1927, 53, 509.)

Determination of Small Amounts of Benzoic Acid in Milk, Butter, Margarine, Meat, and Eggs. J. Grossfield. (*Zeit. Unters. Lebensm.*, 1927, 53, 467.)

Microscopical Determination of Husk Content of Cocoa Powders. R. Turnau. (*Zeit. Unters. Lebensm.*, 1927, 53, 483.)

Simplified Molecular Constant Applied to Milks from the Somme. G. Joret and E. Radet. (*Ann. Falsif.*, 1927, 20, 341, 403.)

# Recent Patents

*The following abstracts are obtained from recently published copies of the "Illustrated Official Journal" (Patents) by permission of the Controller of H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.*

271,883. **Yeast preparations.** E. I. Levin. May 25, 1927. (Not yet accepted.)

A preservable yeast preparation is formed by subjecting species of yeast fungi to a gas containing oxygen, the fungi being converted into asco-spores which are then heat treated to destroy the remaining fungi. The oxygen content of the gas employed is greater than that of air, and may be pure oxygen. In the cultivation of the fungi the cells which are not suitable for conversion are weakened or destroyed by heating, the product being spread in a thin layer and subjected to chemically pure oxygen at a temperature about 30° C. for 20 to 40 hours. The product is now subjected to repeated heat treatment to 50-60° C. to destroy the remaining yeast fungi. A sterile dry substance is preferably mixed with the yeast fungi to facilitate the conversion treatment. The preparation can be used for fermenting in beer, wine, acetic acid manufactures, or for baking purposes when flour is mixed with the yeast fungi before treatment with the oxygen mixture.

274,496. **Dough-dividing machines.** C. C. C. Van Stolk. July 15, 1927 (not yet accepted).

274,727. **Moulding confectionery.** Berten and Co., Ges. and A. Henkel. January 13, 1927.

To enable longer bon-bons to be made, the point of greatest pressure is transferable to a position in front of or behind the point of contact of the common tangent to the dividing rings—*i.e.*, for long symmetrical bon-bons the point is behind, and for asymmetrical bon-bons, in front.

274,738. **Sweetmeats.** A. Werlitz. January 29, 1927.

A chocolate figure, such as a doll, is provided with an interior sound-emitting device. The figure may be made from two or more parts which are afterwards assembled, the part supporting the sound-emitting device being of thick chocolate and the remaining parts of thin chocolate. With this arrangement, the required strength of the supporting-part is acquired, and the loss in the transmission of the sound to the exterior is minimised. The part of the wall actually supporting the sound-emitting device may alone be thickened.

274,796. **Ice-cream freezers.** J. Fahrni. September 17, 1926 (not yet accepted).

Apparatus for freezing at one time several different kinds of ice-cream.

274,824. **Preserving bread, etc.** J. Masson and Anciens Etablissements Fetu-Defize Soc. Anon. May 27, 1927 (not yet accepted).

Baked products—*e.g.*, bread—are preserved in a fresh condition by storage in a hot atmosphere saturated with moisture.

274,834. **Artificially prepared mineral waters.** O. Warburg. June 22, 1927 (not yet accepted).

*Aerating processes; materials for making beverages.*—Mineral waters prepared according to the parent specification contain magnesium and calcium ions added in the form of magnesium potassium chloride and finely ground calcium sulphate. The magnesium potassium chloride is dried at 130-140° C. and added

to the bicarbonate tablet, and the calcium sulphate is ground in a colloid mill and added to the bisulphate tablet.

274,909. **Sterilising and preserving food, etc.** G. A. KRAUSE. July 25, 1927 (not yet accepted).

Substances such as meat, fish, eggs, butter, fruit, vegetables, and anatomical preparations are sterilised and preserved by means of liquids which are or have been in contact with metals such as copper, silver, and gold, or with alloys capable of destroying micro-organisms. The substances may be stored in or mixed with the treated liquids. Butter can be kept fresh longer by treatment both by mixing with and immersion in treated water. The liquids employed include ordinary or distilled water, common salt or other solutions, emulsions, and suspensions, and may be treated in vessels wholly or partly constructed of the metal or alloy or containing it in rod, tubular, plate, or granular form. The liquid may be concentrated by evaporation before use and it may have materials added for increasing the stability of the substance to be treated. The liquid may be kept agitated—*e.g.*, by a stirrer, pump, or air, or other gas blast. The liquid after use may be purified—*e.g.*, by filtration, and then retreated.

274,915. **Medicated foods and fodders.** O. STINER AND B. DIETHELM. July 26, 1927 (not yet accepted).

A foodstuff or fodder is prepared by bringing the solution of a medicament into conjunction with disintegrated vegetable substances. Suitable vegetable substances are dry or dried seeds, seed cases, stalks, and leaves of graminiæ, leguminous plants, and parts of plants such as medullary parts (sago for example) or roots (manioc). These vegetable substances may be mixed with the medicinal substance with or without the application of heat.

274,923. **Biscuit machines.** T. L. GREEN. February 22, 1926.

*Panning-mechanism.*—Relates to biscuit machines of the type involving a reciprocating panner blade and consists in reciprocating the blade at unequal speeds —*e.g.*, a quick advance and slow return—to allow adequate time for the panning stroke while permitting high speed of operation. The invention is particularly designed for use with the high-speed cutting-mechanism described in Specification 275,123.

274,949. **Margarine, etc.** B. JIROTKA. April, 26, 1926.

*Butter substitutes.*—In connection with the manufacture of margarine, etc., wherein the mass or emulsion is passed between cooled rollers or bands, these members are given different peripheral speeds so that where they contact they exert not only a pressing action, but also a rubbing and kneading action upon the mass. Prior to this treatment, the mass is disintegrated by spraying, and this disintegration may be repeated with simultaneous cooling.

275,015. **Preserving crops.** B. J. OWEN. July 30, 1926.

The excavation below the surface of the ground or floor in the arrangement for drying crops by heated air, described in the parent Specification, as modified by the invention described in Specification 248,935, in which heated air passes from a duct having an enlarged delivery orifice into a distributing chamber formed within the stack of material to be treated, is so formed that its walls extend vertically upwards. The bottom of the wall remote from the duct is rounded or curved to a greater degree than at the bottom of the other walls.

275,123. **Biscuit machines.** T. L. GREEN. February 22, 1926.

275,171. **Feeding cherries, nuts, etc., to confection moulds.** NATIONAL EQUIPMENT CO. May 23, 1927 (not yet accepted).

Apparatus for feeding articles such as cherries, nuts, etc., to the starch moulds in confectionery-making machines comprises a conveyor made up of a series of slats mounted on chains and provided with pockets, which pick up the articles from a bin in its upper run, and a band which covers the pockets in the lower run and is adapted to uncover them abruptly as they come over the recesses in the mould trays carried by another conveyor moving in timed relation with the conveyor.

275,183. **Medicinal preparations from animal organs.** G. EICHELBAUM AND J. ALTENBURG. June 21, 1927 (not yet accepted).

In processes for obtaining hormones from animal organs or substances the material, or extracts therefrom, is subjected to the action of ultra-violet rays. The treatment may be carried out in air, but preferably is done in closed vessels under vacuum, or in an inert atmosphere such as carbonic acid, nitrogen, or hydrogen. Tubes or containers of various shapes for the material under treatment may be formed of quartz or Uviol glass or may have an air-tight cover having a panel of such material. The containers, which are moved constantly or intermittently in order to expose fresh surfaces of material, or may be fitted with stirrers, are placed near a quartz lamp, with or without the interposition of a heat filter, or the source of radiation may be placed within the container. Animal materials specified are thyroid glands, ovaries, testicles, brain, and nerve substances, spleen, gall, and pancreas. These may be treated in the fresh or dried condition, either undivided or comminuted, and with or without the addition of inert substances such as silica, kieselguhr, powdered quartz, or powdered coal; or extracts in water, ether, alcohol, or chloroform may be treated in the liquid form or after drying. Before, during, or after treatment the materials may be combined with iodine, bromine, antimony, bismuth, or arsenic, or with combinations of these.

275,184. **Preserving food.** FOOD CHILLERS, LTD. June 24, 1927 (not yet accepted).

Foodstuffs such as meat, eggs, and fruit, are preserved by keeping at a low temperature in an atmosphere of common salt which may be produced by atomisation of a salt solution. The pieces of meat, etc., are wrapped in a gas-permeable covering which does not absorb moisture, and placed with a clear space around each in an insulated chamber having doors. The chamber is then cooled to a temperature above the freezing point, and a salt fog next produced from a salt solution supplied from tank and tubes to atomisers, supplied through pipes with compressed air from a pump. The air is passed

through a cooling coil in a tank, and the condensed water is withdrawn through a trap. The fog may contain between ¼-1 per cent., or more, of salt, and is constantly agitated by fans except during renewal. When fresh fog is being introduced, which may be every eight hours in the case of meat, the used fog and the gases from the meat, etc., in the chamber are expelled through doors or automatic valves located at the bottom of the chamber, and designed to prevent the pressure rising above atmospheric. The humidity is not more than is sufficient to carry the required percentage of salt. Refrigerating means are provided in or connected with the chamber, which is sterilised and dried before use.

275,328. **Yeast**. DISTILLERS CO., LTD., AND E. A. MEYER. May 4, 1926.

In yeast-propagating processes involving the continuous or periodic addition of yeast foods to the propagation medium, the nature of the yeast foods added is changed periodically; for example, strong molasses wort may be added alternately with grain wort for periods of 40 hours and from 6-12 hours respectfully. The change in medium may be such as to change the vitamin content of the medium—*e.g.*, by the addition of skim milk thereto, but may also or alternatively be directed to alteration of the ratio of protein to carbohydrate therein.

275,329. **Yeast**. DISTILLERS CO., LTD., AND E. A. MEYER. May 4, 1926.

In processes for propagating yeast the propagating medium is fully or partially sterilised before use by the addition of a halogen, preferably chlorine or iodine. For example, saturated chlorine water is added to the medium in the proportion of 1 c.c. per litre. Alternatively, calcium or other hypochlorite and an acid may be employed.

275,434. **Food for animals**. A. E. KIENZLE. September 16, 1926.

Maize cobs, either complete with or freed from the grains, are ground and mixed with wet brewery residue consisting of spent malt containing some beer; other wet or dry foodstuffs may be added subsequently. By drying the mixture it may be rendered stable. Suitable proportions are 75 parts (by weight) of dry maize cob flour, groats, or flakes with 25 of ordinary wet spent malt. Average grinding only of the maize material is resorted to, so that an average degree of fineness only is obtained, whereby subsequent sifting produces classes having different proportions of nutrient material. Molasses constitutes a suitable addition to the fodder; for the highest food value, the complete maize cob with its grains is ground. The interaction is such that the fodder may be given in unlimited quantities, which is not the case with brewery residues alone. Prior fodders are mentioned consisting of ground maize stalks mixed with swill from breweries, and of brewers' grains with hay or straw chaff, or maize or other meal.

275,454. **Beverages**. SIEMENS & HALSKE AKT.-GES., H. ENGELHARDT, AND K. ENGELHARDT. November 16, 1926.

Pulverised substances of small specific gravity not exceeding four—*e.g.*, burnt magnesia, chalk, French chalk, pulverised aluminium, beryllium, or their oxides, are mixed with alcoholic beverages or fruit juices in the process of artificially maturing them with ozone. The pulverised substance is preferably mixed with a small quantity of the beverage, and the mixture then added, with stirring, to the main body. The liquid is subsequently allowed to settle, and the clear liquid drawn off, filtered if necessary, and allowed to stand for a few days. The pulverised substances are stated to eliminate oxidation products detrimental to flavour.

275,710. **Making wafer biscuits**. D. ANTONELLI. May 10, 1926.

275,818. **Moulding-machines**. BERTEN AND CO., GES. AND E. HENKEL. October 8, 1926.

276,060. **Moulding dough, etc.** BAKER, PERKINS, LTD., AND W. E. PRESCOTT. May 17, 1926.

*Extrusion machines.*—Relates to extrusion presses for moulding plastic substances in sheet, rope, or other form, and more particularly to apparatus for extruding dough in sheet form. According to the invention, the die or nozzle of such apparatus is formed with smooth walls, one or more of which is or are of resilient and flexible material, and means are provided, adjacent to the outlet end of the extrusion aperture, for adjusting the distance between the walls, whilst the distance between the walls at the inlet end of the die is maintained constant.

276,061. **Cakes.** BAKER, PERKINS, LTD., AND C. E. TARONI. May 17, 1926.

For making sponge cake and the like in the form of a continuous sheet, the sponge material or batter is passed through a baking chamber together with and supported by a continuous base sheet, strip, or the like of paper, etc., which is afterwards stripped off.

276,132. **Preserving liquid egg materials.** W. MATZKA. August 6, 1926.

Liquid eggs, or the yolks or whites, are sterilised by bringing into simultaneous contact with a body of gold or other noble metal, and a body of aluminium while heating to a temperature up to 60° C., preferably 30-55° C. The metals may be independently heated, preferably to different temperatures, and may be electrically connected, or connected to an electric current source, the gold being the cathode. The noble metal may be replaced by a commoner metal—*e.g.*, copper, tipped with gold. Liquid egg may have 2-4 per cent. of salt dissolved therein, and be then evaporated at low temperature until it is fairly viscous—*e.g.*, until 30-45 per cent. of the water is removed. It is next sterilised by passing through the apparatus described in Specification 267,377 at a temperature of 58° C. In treating yolks, 2-8 per cent. of salt may be added before sterilisation, the material being finally cooled and filled into sterile drums, etc. Specifications 267,058 and 276,254 are also referred to.

276,137. **Aerating water.** W. A. HOVEMAN, F. C. HOVEMAN, AND BUHRINGS FILTERS, LTD. August 12, 1926.

276,148. **Moulding confectionery.** F. M. SCHULER. August 25, 1926.

*Depositing machines.*—Apparatus for moulding candies, particularly coated candies, in starch moulds.